Fishery Management Report No. 15-40

Recreational Fisheries in the Bristol Bay Management Area, 2013–2015

by

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and

Ian K. Fo

November 2015

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat or long
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: http://www.adfg.alaska.gov/sf/publications/. This publication has undergone regional peer review.

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ABSTRACT

This report summarizes the major sport fisheries in the Bristol Bay Management Area during 2013, 2014, and 2015. Fisheries include Chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), and sockeye salmon (*O. nerka*), rainbow trout (*O. mykiss*), Arctic char (*Salvelinus alpinus*), Dolly Varden (*Salvelinus malma*), Arctic grayling (*Thymallus arcticus*), and northern pike (*Esox lucius*). Numerous significant sport fisheries are described, and estimates of sport fishing effort, catch, and harvest, and salmon escapements are provided. Overviews of the management for each fishery are provided, including sport fishing regulations and management plans.

Key words: Bristol Bay Sport Fish Management Area, Alaska Board of Fisheries, management plan, Nushagak River, Togiak River, Naknek River, rainbow trout, *Oncorhynchus mykiss*, Chinook salmon, *Oncorhynchus tshawytscha*, coho salmon, *Oncorhynchus kisutch*, sockeye salmon, *Oncorhynchus nerka*.

INTRODUCTION

MANAGEMENT AREA DESCRIPTION

The Bristol Bay Sport Fish Management Area (BBMA) is part of the Division of Sport Fish's Southcentral Region (Region II) and includes all waters and drainages flowing into Bristol Bay between Cape Newenham in the northwest to Cape Menshikof in the southeast (Figure 1).

The sport fisheries of this large region are more easily discussed by dividing the management area into 3 geographic sections: Eastern, Central, and Western (Figure 1). The section boundaries, which encompass one or more adjacent drainages, are located somewhat arbitrarily. However, for some species, particularly rainbow trout, the section boundaries delineate distinct differences in the character of the fisheries or the biology of the local stocks.

The Eastern Section includes all drainages from the Kvichak River to the area's southern boundary at Cape Menshikof (Figure 1). Major federal jurisdictions in the Eastern Section include the Lake Clark National Park and Preserve, Katmai National Park and Preserve, and the Becharof National Wildlife Refuge. The Central Section is composed of the drainages entering Nushagak Bay and is dominated by the Nushagak and Wood River systems. The Wood–Tikchik State Park falls within the Central Section boundaries. The Western Section includes all drainages from Cape Constantine on the Nushagak Peninsula west to Cape Newenham and contains portions of the Togiak National Wildlife Refuge. The Togiak River is the major drainage within the section.

Major communities located within the area include Togiak, Dillingham, Iliamna, King Salmon, Naknek, Egegik, and Pilot Point. The management area is not linked to the State of Alaska highway system, although local roads provide sport fishermen with limited access near the major communities. Float-equipped aircraft, and to a lesser extent boats, are commonly used to access the area's many remote fisheries.

Although the Alaska Department of Fish and Game (ADF&G) has management jurisdiction for sport fisheries in the BBMA, the United States Fish and Wildlife Service (USFWS), National Park Service (NPS), and United States Geological Survey (USGS) manage federal public lands and conduct research in the area.

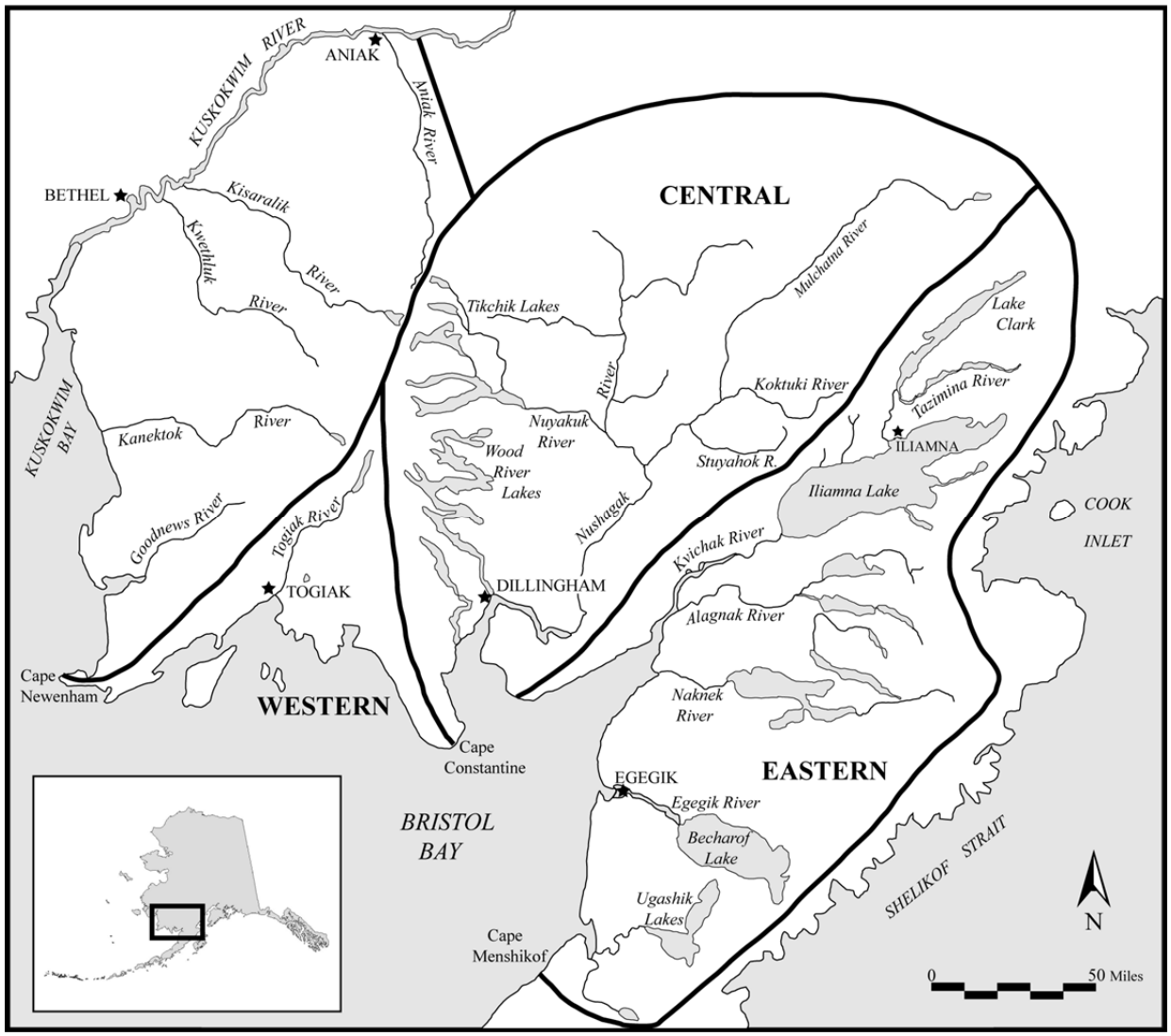

Figure 1.–Bristol Bay Sport Fish Management Area, showing the Eastern, Central, and Western sections.

INFORMATION SOURCES FOR MANAGEMENT

ADF&G utilizes several sources of information to manage fisheries in the BBMA. One of the primary means for monitoring sport fishing effort, catch, and harvest is a mail survey by ADF&G called the Statewide Harvest Survey (SWHS) (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). This annual survey, begun in 1977, estimates the number of angler-days of sport fishing effort expended by anglers in Alaskan waters (residents as well as nonresidents), and harvest by species. The survey provides estimates of effort and harvest on a site-by-site basis but is not designed to provide estimates of effort directed toward a single species. Beginning in 1990, the survey was modified to include estimates of catch (release plus harvest) on a site-by-site basis. The BBMA includes portions of 3 areas defined in the SWHS: a portion of the Naknek River Drainage–Alaska

Peninsula Area (Area R) excluding the saltwater fisheries and freshwater fisheries of Cold Bay and the Aleutian Islands, the Kvichak Area (Area S), and the Nushagak Area (Area T).

In addition to the SWHS, ADF&G Division of Sport Fish (SF) has operated the freshwater logbook program since 2005, which requires sport fishing guide businesses to record sport fishing effort, catch, and harvest by freshwater commercially guided clients (Sigurdsson and Powers 2009-2014).

Creel surveys have been selectively used to ground-truth the SWHS and the freshwater logbook program for fisheries of interest or for fisheries that require more detailed information or inseason management. For BBMA, these include creels surveys of the Alagnak River (Brookover 1989; Dunaway 1990a, 1994; Naughton and Gryska 2000; Collins and Dye 2003), the Kvichak River (Dunaway and Fleischman 1996b), Lower Talarik Creek (Russell 1977; Minard 1990; Minard et al. 1992; and unpublished data[1]), and the Nushagak River (Dye 2012).

ADF&G also conducts stock assessment projects. For example, on the Nushagak and Mulchatna rivers, significant monitoring and stock assessment projects have been conducted intermittently since 1986 (Minard 1987; Minard and Brookover 1988a; Dunaway et al. 1991; Dunaway and Bingham 1992; Dunaway and Fleischman 1995; Minard et al. 1998; Dye 2005; Cappiello and Dye 2006; Dye 2012).

Commercial and subsistence harvests of salmon are monitored and reported by the ADF&G Division of Commercial Fisheries (Elison et al. 2015). For larger fisheries, forecasts of each season's run are provided by the Division of Commercial Fisheries (CF) and are reported in a statewide salmon forecast summary (Jones et al. 2014; Elison et al. 2015).

Escapements of some salmon stocks are monitored by counting towers, sonar, or aerial index surveys. For example, in the Nushagak River, escapement is estimated by sonar as the salmon migrate upriver (Elison et al. 2015). Historically, aerial index surveys of Chinook salmon (*Oncorhynchus tshawytscha*) in the drainages of the Nushagak, Togiak, Alagnak, and Naknek rivers are also conducted. Due to budget shortfalls, most of these aerial index surveys were suspended from 2009 through 2014.

SPORT FISHING EFFORT AND HARVEST

The BBMA contains some of the most productive waters in the world for Pacific salmon (*Oncorhynchus* spp.), rainbow trout (*O. mykiss*), Arctic grayling (*Thymallus arcticus*), Arctic char (*Salvelinus alpinus*), and Dolly Varden (*S. malma*). The area has been acclaimed for its sport fisheries since the 1930s.

Total sport fishing effort in the BBMA increased from about 25,000 angler-days in 1977 to a peak of more than 116,000 angler-days in 1995. From 2009 through 2013, total annual effort in the BBMA averaged 77,269 angler-days and effort during 2014 was 89,942 angler-days (Table 1). From 2009 through 2013, guided sport fishing effort has averaged 29,303 angler-days (Table 2). Based on recent trends and current economic stability, sport fishing effort is expected to stabilize or slowly increase during the foreseeable future.

[1] Memos summarizing the Lower Talarik Creek rainbow trout projects, located at Alaska Department of Fish and Game, Division of Sport Fish, Dillingham are as follows: 1997 data from J. Dye, dated October 15, 1997, Dillingham; 1998 data from C. Schwanke, dated December 1, 1998; 1999 data from J. Dye to Bob Clark, dated November 15, 2000; 2000 data from J. Dye and M. Cavin to Bob Clark, dated November 15, 2000; 2001 data from J. Dye to Bob Clark, dated January 2002; 2003 data from C. Collins to James Hasbrouck, dated August 12, 2004; 2004 data from T. Jaecks to James Hasbrouck, dated January 23, 2005.

Table 1.–Sport fishing effort in angler-days by section and drainage, Bristol Bay Management Area, 2004–2014, including 1977–2003 average.

Section	Drainage	Average 1977–2003	Annual sport fishing effort (angler-days)										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Eastern														
	Naknek R.	13,980	16,956	12,699	14,928	17,744	14,444	16,850	16,828	14,465	12,704	12,723	14,714	16,202
	Brooks R.	3,109	3,317	1,945	3,887	3,882	3,951	2,513	3,469	4,227	3,607	3,426	3,448	3,696
	Kvichak R.	3,601	4,219	5,463	7,022	5,557	5,849	6,015	6,061	6,045	5,313	4,080	5,503	4,172
	Copper R.	1,852	1,349	1,082	1,868	2,513	1,520	1,959	1,756	2,246	2,625	3,082	2,334	3,427
	Alagnak R.	6,573	9,028	11,228	11,747	8,881	8,652	5,541	6,549	5,669	5,039	4,782	5,516	6,013
	Newhalen R.	4,025	1,842	1,273	2,169	1,643	1,470	1,370	968	1,048	540	1,498	1,085	429
	Lake Clark	2,515	2,886	1,244	1,103	1,377	2,008	1,725	1,964	1,586	965	3,193	1,887	3,341
	Other	9,775	17,216	14,083	14,028	18,944	15,872	10,177	13,828	14,824	12,355	5,342	11,305	12,591
	Subtotal [a]	45,430	56,813	49,017	56,752	60,541	53,766	46,150	51,423	50,110	43,148	38,126	45,791	49,871
Central														
	Nushagak R.	8,743	18,869	17,841	15,302	16,970	14,936	13,991	8,671	11,329	14,973	16,082	13,009	17,568
	Mulchatna R.	3,139	2,218	3,071	3,930	3,084	1,524	1,157	879	1,548	1,573	1,415	1,314	1,341
	Agulowak R.	1,567	2,712	4,094	2,804	3,966	2,040	1,641	1,953	2,065	1,136	1,176	1,594	1,993
	Agulukpak R.	1,325	1,473	1,406	1,086	1,249	1,239	1,430	924	2,480	738	689	1,252	796
	Wood River L. [b]	5,706	8,884	10,547	6,596	7,300	6,484	3,893	4,013	9,146	2,953	7,988	5,599	6,678
	Tikchik L.and Nuyakuk R.	2,127	2,899	2,001	1,009	2,145	2,070	1,419	1,278	4,255	1,353	1,353	1,932	2,964
	Other	2,930	3,693	3,519	8,129	2,371	1,185	1,060	997	983	1,123	638	960	396
	Subtotal [a]	25,537	38,774	42,479	38,856	37,085	29,478	24,591	18,715	31,806	23,849	29,341	25,660	31,736
Western														
	Togiak R.	2,351	6,249	6,235	4,772	5,181	4,695	3,638	3,636	4,326	9,526	3,170	4,859	8,098
	Other	355	160	37	70	884	249	1,583	1,034	758	1,502	1,037	1,183	237
	Subtotal [a]	2,706	6,409	6,272	4,842	5,218	4,944	5,221	4,670	5,084	9,905	4,207	5,817	8,335
Total		73,673	101,996	97,768	100,450	102,844	88,188	75,962	74,808	87,000	76,902	71,674	77,269	89,942

Source: Estimates from Alaska Statewide Harvest Survey (SWHS) were obtained from the Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

Note: "Angler-day" is the time spent fishing by 1 person for any part of a day.

[a] Subtotals of averages may not be the sum of the drainages because information for some drainages is not available for some years.

[b] Wood River Lakes includes Lake Nunavaugaluk. Prior to 1998, Agulowak and Agulukpak rivers were included in Wood River Lakes.

Table 2.–Total guided sport fishing effort in angler-days in selected waters of the BBMA, 2006–2013.

	Annual guided sport fishing effort (angler-days)								Average 2009–2013
Drainage	2006	2007	2008	2009	2010	2011	2012	2013	
Ugashik River	186	434	339	216	302	406	285	298	301
Naknek River	4,006	3,981	4,273	3,923	3,160	4,162	3,444	3,784	3,695
Brooks River	848	858	833	664	751	1,090	1,155	1,021	936
Alagnak River	5,066	4,732	4,152	3,057	2,809	2,954	2,462	2,780	2,812
Kvichak River	2,156	1,927	2,218	1,585	2,538	1,451	1,030	988	1,518
Newhalen River	252	254	314	120	159	46	220	186	146
Lower Talarik Creek	165	123	143	101	129	123	151	116	124
Nushagak River downstream of Mulchatna River	8,559	7,632	7,738	5,539	3,920	4,056	6,208	6,799	5,304
Nushagak River upstream of Mulchatna River	741	715	330	100	630	732	544	601	521
Togiak River	2,485	2,211	1,818	1,223	873	1,094	1,429	1,470	1,218
All Bristol Bay drainages	40,038	38,573	37,879	29,906	26,739	29,658	29,373	30,841	29,303

Source: ADF&G freshwater logbook database and Sigurdsson and Powers (2009–2014).

Historically, more than 60% of the sport fishing effort has occurred on average (1977–2003) in the waters of the Eastern Section of the BBMA (Figure 2). Although the Eastern Section effort still dominates, the percentage has declined slightly with the growth of fisheries in the other sections (Figure 2). On average, the Eastern Section has accounted for 59% of the total effort from 2009 through 2013. The Central Section typically accounts for the second largest proportion of effort, followed by the Western Section. Distribution of effort among sections during 2014 was similar to other recent seasons (Figure 2).

Sockeye salmon (*O. nerka*), Chinook salmon (referred to as "king salmon" in regulatory language), and coho salmon (*O. kisutch*) are the most popular species harvested in the BBMA, with fewer chum (*O. keta*) and pink (*O.gorbuscha*) salmon, Dolly Varden, Arctic char, Arctic grayling, and rainbow trout taken annually (Tables 3 and 4). The apparent decline in harvests of nonsalmon species is likely due in part to the accepted catch-and-release ethic among sport anglers as well as bag limit reductions for Dolly Varden and Arctic char, northern pike (*Esox lucius*), and Arctic grayling adopted by the Alaska Board of Fisheries (BOF) in 1997, 2001, and 2006.

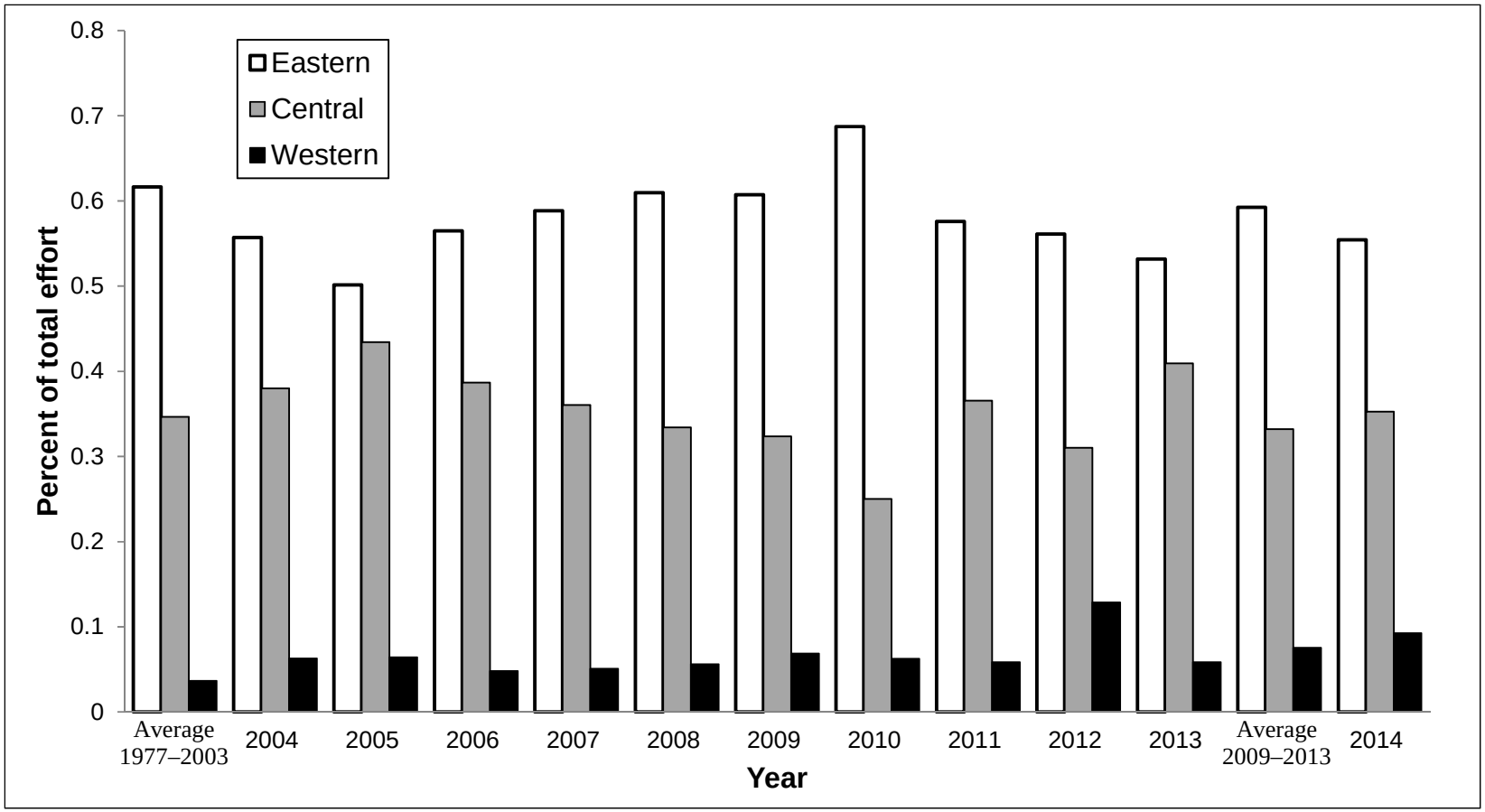

Figure 2.–Percent of total sport fishing effort by section for the Bristol Bay Management Area, 2004–2014, including 1977–2003 average.

Table 3.–Numbers of fish harvested by species in recreational fisheries in the BBMA, 2004–2014, including 1977–2003 average.

Species	Average 1977–2003	Annual sport fishing harvest 2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average 2009–2013	2014
Sockeye salmon	12,725	12,071	11,925	17,658	14,835	18,593	17,874	14,725	14,068	14,341	13,218	14,845	14,747
Chinook salmon	10,176	13,195	13,076	12,838	13,821	9,969	9,671	6,224	10,412	10,009	9,794	9,222	10,671
Coho salmon	8,868	17,977	12,447	14,164	13,139	20,152	13,375	12,917	13,535	16,722	12,380	13,786	20,699
Dolly Varden and Arctic char	5,743	6,268	2,177	2,104	3,076	1,930	2,393	2,897	2,594	1,657	1,766	2,261	2,137
Rainbow trout	4,121	1,932	1,902	1,108	2,411	1,255	462	766	1,961	652	323	833	648
Arctic grayling	4,439	3,010	839	959	1,793	1,836	1,129	1,411	999	809	640	998	799
Pink salmon	1,163	3,138	550	625	437	1,579	47	1,170	79	1,430	124	570	1,079
Lake trout	1,283	1,289	1,309	435	738	920	645	724	1,370	188	719	729	599
Chum salmon	1,820	1,848	2,703	1,509	501	1,458	1,443	2,159	1,267	1,497	2,946	1,862	1,344
Northern pike	1,410	1,751	1,626	1,293	1,051	812	1,545	614	780	442	917	860	715
Total	51,748	62,479	48,554	52,693	51,802	58,504	48,584	43,607	47,065	47,747	42,827	45,966	53,438

Source: Estimates from Alaska Statewide Harvest Survey (SWHS) were obtained from the Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

Table 4.–Total guided sport fishing harvest by species in selected waters of the BBMA, 2006–2013.

Drainage	Species	Anuual guided sport fishing harvest								Average 2009–2013
		2006	2007	2008	2009	2010	2011	2012	2013	
Ugashik River										
	Chinook salmon	76	4	0	4	6	1	1	2	3
	Coho salmon	47	190	73	97	58	48	84	112	80
	Sockeye salmon	2	25	1	15	3	9	2	24	11
	Rainbow trout	0	0	0	0	0	0	0	0	0
Naknek River										
	Chinook salmon	1,073	910	790	661	469	608	608	768	623
	Coho salmon	1,776	1,891	3,081	2,125	960	1,880	1,819	2,014	1,760
	Sockeye salmon	1,416	2,656	2,513	1,980	2,142	2,068	2,109	2,505	2,161
	Rainbow trout	43	52	12	24	13	9	21	32	20
Brooks River										
	Chinook salmon	2	5	0	0	1	0	0	2	1
	Coho salmon	0	0	1	3	0	0	0	0	1
	Sockeye salmon	4	21	10	8	8	4	1	18	8
	Rainbow trout	41	67	0	0	5	6	7	40	12
Alagnak River										
	Chinook salmon	693	540	308	150	254	345	290	284	265
	Coho salmon	815	601	663	558	609	442	493	849	590
	Sockeye salmon	3,347	3,903	3,787	2,494	2,522	2,686	2,182	1,686	2,314
	Rainbow trout	160	322	13	7	14	3	3	17	9
Kvichak River										
	Chinook salmon	34	4	66	7	3	1	0	0	2
	Coho salmon	361	260	357	335	599	254	194	139	304
	Sockeye salmon	1,145	1,446	2,267	1,319	2,156	1,476	1,255	1,049	1,451
	Rainbow trout	91	141	29	12	39	13	4	2	14
Newhalen River										
	Chinook salmon	0	0	0	1	0	0	8	0	2
	Coho salmon	15	2	3	16	10	4	9	64	21
	Sockeye salmon	593	459	1,099	392	533	167	663	499	451
	Rainbow trout	0	0	0	0	0	0	6	0	1
Lower Talarik Creek										
	Chinook salmon	0	0	0	0	0	0	0	0	0
	Coho salmon	5	0	5	9	32	2	14	3	12
	Sockeye salmon	0	0	0	0	6	12	65	11	19
	Rainbow trout	0	0	0	0	0	0	0	0	0
Nushagak and Mulchatna rivers										
	Chinook salmon	5,254	4,324	4,621	3,030	1,567	2,140	3,827	3,823	2,877
	Coho salmon	1,025	1,159	2,135	1,704	1,723	1,723	1,993	2,993	2,027
	Sockeye salmon	134	89	264	29	53	81	139	388	138
	Rainbow trout	39	216	24	2	19	12	9	16	12
Togiak River										
	Chinook salmon	1,037	1,078	685	539	477	455	521	543	507
	Coho salmon	1,978	1,353	1,945	887	597	878	1,407	1,603	1,074
	Sockeye salmon	123	140	269	44	2	22	70	28	33
	Rainbow trout	13	13	10	0	9	0	1	3	3

-continued-

Table 4.–Page 2 of 2.

Drainage	Species	Annual guided sport fishing harvest 2006	2007	2008	2009	2010	2011	2012	2013	Average 2009–2013
All drainages										
	Chinook salmon	8,169	6,865	6,470	4,392	2,777	3,550	5,255	5,422	4,279
	Coho salmon	6,022	5,456	8,263	5,734	4,588	5,231	6,013	7,777	5,869
	Sockeye salmon	6,764	8,739	10,210	6,281	7,425	6,525	6,486	6,208	6,585
	Rainbow trout	387	811	88	45	99	43	51	110	70

Source: ADF&G freshwater logbook database and Sigurdsson and Powers (2009–2014).

MANAGEMENT PLANS AND POLICIES

The following section is a list of the various management plans adopted or implemented by the BOF that guide ADF&G's management of Bristol Bay sport fisheries. For those plans specifically adopted as a regulation, the Alaska Administrative Code (AAC) is provided. Additional information is provided later in the pertinent fishery sections. There are other management plans that address commercial salmon fisheries that do not directly address sport fisheries management, but may affect sport fisheries to some extent. These plans are more fully discussed under the specific sport fishery where such plans may be a factor.

Nushagak–Mulchatna King Salmon Management Plan

Management of the subsistence, commercial, and sport fisheries for Nushagak Chinook salmon stocks is governed by the *Nushagak–Mulchatna King Salmon Management Plan* (5 AAC 06.361). The plan was first adopted by the BOF in January 1992 and most recently modified during the December 2012 meeting.

Nushagak River Coho Salmon Management Plan

Management of the subsistence, commercial, and sport fisheries for Nushagak coho salmon stocks is governed by the *Nushagak River Coho Salmon Management Plan* (5 AAC 06.368). The plan was first adopted by the BOF during the December 1995 meeting. The purpose of this plan is to provide management guidelines to ensure an adequate spawning escapement of coho salmon into the Nushagak River system.

Kvichak River Drainage Sockeye Salmon Management Plan

To ensure biological spawning escapement requirements of sockeye salmon into the Kvichak River drainage, the BOF adopted the *Kvichak River Drainage Sockeye Salmon Management Plan* (5 AAC 67.025) during the January 2001 meeting. The impetus for this plan was the poor sockeye salmon runs of 1999 and 2000. This is an inriver plan that addresses sport and subsistence fisheries only.

Southwest Alaska Rainbow Trout Management Plan

In February 1990, the BOF overhauled nearly all regulations for rainbow trout fisheries in the 2 management areas now known as the Bristol Bay Management Area and Kuskokwim–Goodnews Sport Fish Management Area. The new regulations essentially implement the *Southwest Alaska Rainbow Trout Management Plan* without adopting the plan's language into regulation. However, the BOF recognized the plan as a guiding policy to achieve and maintain a more orderly and comprehensive mix of rainbow trout angling opportunities throughout the 2

areas. The overriding philosophy of the *Southwest Alaska Rainbow Trout Management Plan* is one of conservative wild stock management (ADF&G 1990). In 1998, the BOF adopted *Criteria for Establishing Special Management Areas for Trout* (5 AAC 75.013; subsequently amended as 5 AAC 75.210). This regulation embodies most of the criteria that originated and are still used in the Southwest Alaska Rainbow Trout Management Plan.

Statewide Policy and Plan for Management of Sustainable Wild Rainbow Trout Fisheries

The BOF adopted the *Policy for the Management of Sustainable Wild Trout Fisheries* (5 AAC 75.222), and *Statewide Management Standards for Wild Trout* (5 AAC 75.220) in March 2003. The policy provides principles and criteria to ensure conservation, sustainability, and optimal sustained yield and benefits for wild trout, and provides direction to the BOF and ADF&G as to how those principles and criteria are to be applied in the regulatory process. The plan ensures conservative management of wild trout fisheries while recognizing existing plans and policies that guide management of wild trout on a regional basis.

In most areas of the state, conservative management for wild rainbow trout, cutthroat trout, and steelhead trout, in combination, means a bag and possession limit of 2 fish, of which only 1 may be 20 inches or greater in length, with an annual limit of 2 fish 20 inches or greater in length. The plan recognizes existing plans and policies that guide management of wild trout on a regional basis, and allows the BOF to adopt regulations that deviate from the plan as necessary to address sustainability or optimal sustained yield issues, establish special management areas, or liberalize harvest opportunities in specific water bodies under other criteria.

Sustainable Salmon Fisheries Policy for Alaska

In March 2000, the BOF adopted the *Policy for the Management of Sustainable Salmon Fisheries* (5 AAC 39.222), which became an integral part of the BOF's yearly review of the state's salmon fisheries. The policy contains 5 fundamental principles for sustainable salmon management, each with criteria that are to be used by ADF&G and the BOF to evaluate the health of the state's salmon fisheries and address any conservation issues and problems as they arise. The 5 fundamental principles of the policy are as follows:

1) Wild salmon populations and their habitats must be protected to maintain resource productivity.
2) Fisheries shall be managed to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning.
3) Effective salmon management systems should be established and applied to regulate human activities that affect salmon.
4) Public support and involvement for sustained use and protection of salmon resources must be maintained.
5) In the face of uncertainty, salmon stocks, fisheries, artificial propagation, and essential habitats must be managed conservatively.

The policy requires that ADF&G describe the extent to which salmon fisheries and their habitats conform to explicit principles and criteria. In response to these reports, the BOF must review fishery management plans or create new ones. If a salmon stock of concern is identified in the

course of this review, the management plan will contain measures to address the concern, including needed research, habitat improvements, or new regulations.

EMERGENCY ORDERS ISSUED IN 2013 THROUGH 2015

There was 1 emergency order issued in 2013, 3 issued in 2014, and none were issued in 2015.

Emergency Order 2-SS-5-47-13

Issued: August 9, 2013

Effective Date: 12:01 AM, Saturday, August 10, 2013

Expiration Date: 11:59 PM, Tuesday, December 31, 2013

Unless superseded by subsequent emergency order

This emergency order increased the bag and possession limit for coho salmon from 5 to 10 in all waters of the Nushagak–Mulchatna rivers drainage, excluding the Wood River drainage. The limit for other salmon, other than Chinook salmon, remained at 5 per day, 5 in possession. These limits were in addition to the more liberal limits for coho salmon.

Emergency Order 2-KS-5-32-14

Issued: July 3, 2014

Effective Date: 12:01 AM, Monday, July 7, 2014

Expiration Date: 11:59 PM, Wednesday, December 31, 2014

Unless superseded by subsequent emergency order

This emergency order reduced the bag and possession limit for Chinook salmon 20 inches or greater in length from 2 fish, only 1 of which may exceed 28 inches in length to 1 fish 20 inches or greater in length in all waters of the Nushagak–Mulchatna rivers drainage beginning 12:01 AM, Monday, July 7, 2014.

Emergency Order 2-RS-5-33-14

Issued: July 3, 2014

Effective Date: 12:01 AM, Friday, July 4, 2014

Expiration Date: 11:59 PM, Wednesday, December 31, 2014

Unless superseded by subsequent emergency order

This emergency order increased the bag and possession limit for sockeye salmon from 5 per day, 5 in possession to 10 per day, 10 in possession in all waters of the Wood River drainage beginning 12:01 AM, Friday, July 4, 2014. The limit for other salmon, except Chinook and sockeye salmon, remained at 5 per day, 5 in possession. These limits were in combination with the more liberal limit for sockeye salmon.

Emergency Order 2-KS-5-37-14

Issued: August 6, 2014

Effective Date: 12:01 AM, Thursday, August 7, 2014

Expiration Date: 11:59 PM, Wednesday, December 31, 2014

Unless superseded by subsequent emergency order

This emergency order increased the bag and possession limit for coho salmon in all waters of the Nushagak–Mulchatna rivers drainage, excluding the Wood River drainage. Beginning 12:01 AM, Thursday, August 7, 2014, the bag and possession limit for coho salmon was 10 per day; 10 in possession. The limit for pink, sockeye, and chum salmon in combination remained at 5 per day, 5 in possession. These limits were in addition to the more liberal limits for coho salmon.

CHINOOK SALMON FISHERIES

AREAWIDE FISHERY DESCRIPTION

Bristol Bay is home to several world-class Chinook salmon sport fisheries. The peaks of the Chinook salmon sport fisheries occurs from mid-June to late July in the lower reaches of the Alagnak, Nushagak, Naknek, and Togiak rivers, as well as several smaller rivers (Figure 3). Chinook salmon stocks throughout the management area significantly increased in measures of abundance from the late 1970s through the early 1980s. From about 1984 through 2009, Chinook salmon abundance in Bristol Bay returned to previous levels. With some exceptions during 2010 through 2014, Chinook salmon abundance decreased significantly and then rebounded in 2015.

The Bristol Bay commercial fishery generally takes the majority of the area's annual Chinook salmon harvest. The majority of these fish are harvested incidentally during the sockeye salmon commercial fishery. From 1994 through 2003, the annual commercial harvest ranged from 15,750 to 140,908 Chinook salmon with an average of nearly 70,000 (Elison et al. 2015). Since 2003, the commercial take has ranged from 14,487 (2015) to 114,280 (2004) with an average of 52,221 fish annually (Elison et al. 2015). Subsistence harvests from 2004 through 2013 averaged 14,043 Chinook salmon annually, ranging from a low of 10,852 (2010) fish to a high of 18,012 fish (2004) (Elison et al. 2015).

In the BBMA, the Chinook salmon sport fisheries, like the sport fisheries for most other species, are fished primarily by guided anglers. With few exceptions, the guided to unguided angler ratio is about 3 to 1. Anglers usually keep less than 50% of the fish they catch, especially since the adoption of areawide annual bag limits (see management section below).

Sport fishing harvests of Chinook salmon have loosely followed trends in abundance, reaching historical peaks of 16,604 fish in 1987 and 17,504 fish in 1994 (Dunaway and Sonnichsen 2001). Chinook salmon typically account for approximately 20–30% of the sport salmon harvest in Bristol Bay. The 2009 through 2013 sport harvest estimate averaged 9,222 Chinook salmon (Table 5). The 2014 sport harvest for the entire Bristol Bay Management Area was 10,671 Chinook salmon (Table 5) and the 2014 commercial harvest was 15,077 Chinook salmon (Elison et al. 2015).

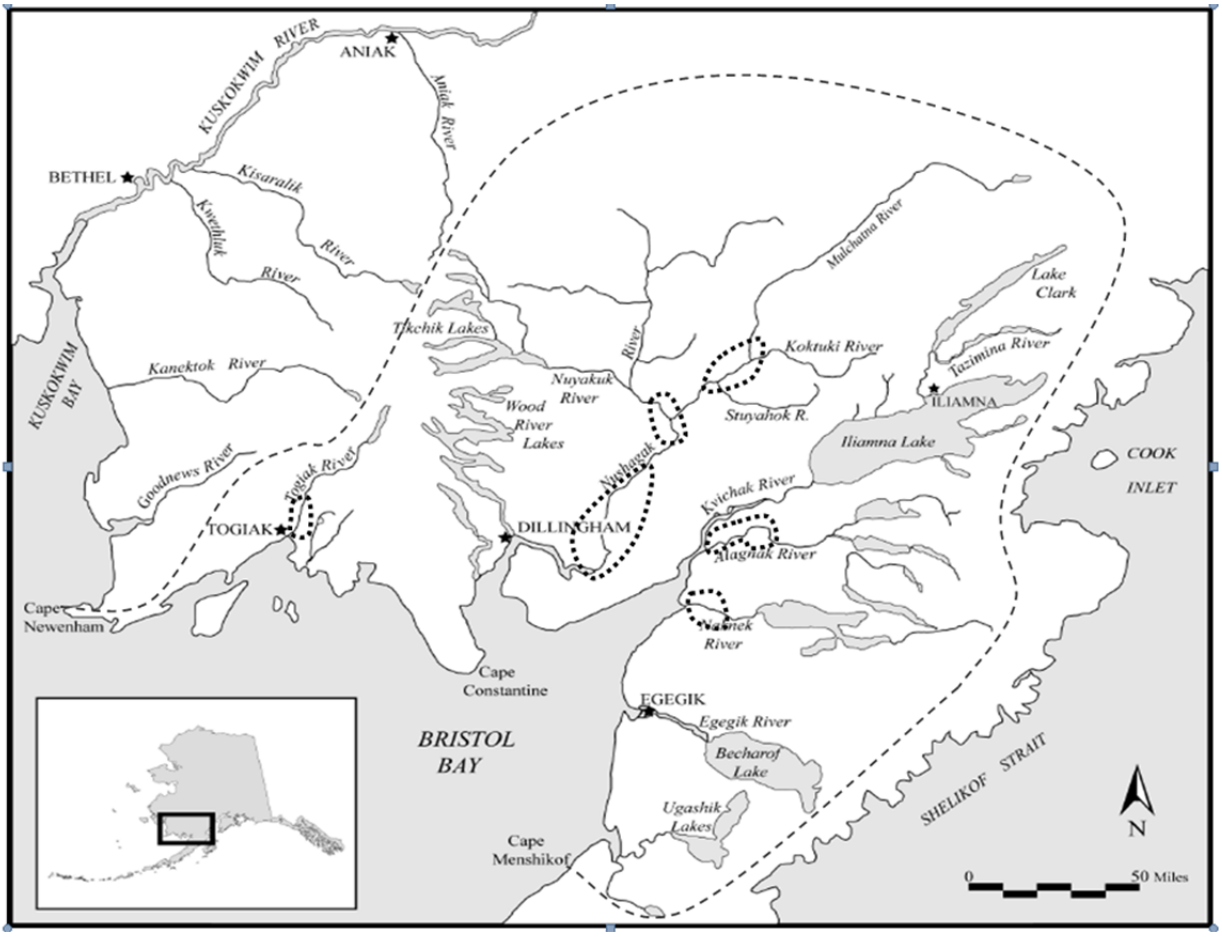

Figure 3.–Popular Chinook salmon sport fisheries (delineated with dark dots) in the Bristol Bay Sport Fish Management Area.

Table 5.–Sport harvest of Chinook salmon, by section and drainage in the BBMA, 2004–2014, including 1977–2003 average.

Section	Drainage	Average 1977–2003	Annual sport fishing harvest of Chinook salmon										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Eastern														
	Naknek R.	2,451	3,004	2,140	2,558	1,431	1,285	2,279	1,266	2,416	2,288	1,242	1,898	1,071
	Brooks R.	0	0	0	0	0	0	0	0	0	0	0	0	0
	Kvichak R.	166	27	217	80	68	344	91	0	110	56	111	74	41
	Copper R.	2	27	0	0	0	26	0	0	0	307	0	61	0
	Alagnak R.	402	1,146	1,008	1,052	1,007	394	199	418	1,317	512	823	654	983
	Newhalen R.	0	13	0	0	0	78	0	0	0	0	0	0	0
	Lake Clark	0	0	0	0	0	42	0	0	0	0	0	0	0
	Other	188	557	267	460	0	156	10	26	40	42	15	27	134
	Subtotal [a]	3,210	4,774	3,632	4,150	2,506	2,325	2,579	1,710	3,883	3,205	2,191	2,714	2,229
Central														
	Nushagak R.	5,451	6,773	7,399	7,429	9,212	6,505	6,217	3,843	4,762	5,276	6,332	5,286	5,796
	Mulchatna R.	300	40	134	44	287	91	58	0	82	351	236	145	337
	Agulowak R.	1	0	0	0	0	0	0	0	0	0	0	0	16
	Agulukpak R.	2	0	0	0	0	0	0	0	22	0	0	4	0
	Wood River L. [b]	167	87	15	94	111	26	48	16	8	14	0	17	0
	Tikchik L.–Nuyakuk R.	49	93	61	0	170	104	0	64	50	304	117	107	0
	Other	49	40	101	57	34	26	163	0	32	0	0	39	127
	Subtotal [a]	6,019	7,033	7,710	7,624	9,814	6,752	6,486	3,923	4,956	5,945	6,685	5,599	6,276
Western														
	Togiak R.	684	1,388	1,734	1,064	1,501	892	606	591	1,438	859	900	879	2,166
	Other	5	0	0	0	0	0	0	0	135	0	18	31	0
	Subtotal [a]	689	1,388	1,734	1,064	1,501	892	606	591	1,573	859	918	909	2,166
Total		7,570	13,195	13,076	12,838	13,821	9,969	9,671	6,224	10,412	10,009	9,794	9,222	10,671

Source: Estimates from Alaska Statewide Harvest Survey (SWHS) were obtained from the Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Subtotals of averages may not be the sum of the drainages because information for some drainages is not available for some years.

[b] Wood River Lakes includes Lake Nunavaugaluk. Prior to 1998, Agulowak and Agulukpak rivers were included in Wood River Lakes.

AREAWIDE FISHERY MANAGEMENT AND OBJECTIVES

Since 1960, bag limits for Chinook salmon in Bristol Bay and across Alaska have become increasingly conservative and complex. The most conservative and sweeping regulatory changes to the area's Chinook salmon fisheries were adopted during the November and December 1997 BOF meetings. A Bristol Bay-wide annual limit of 5 Chinook salmon was adopted, and in the Nushagak River drainage, anglers were further restricted to an annual limit of 4 Chinook salmon. The daily bag limits in several other major fisheries were reduced slightly. Season closures of July 25 or July 31 were adopted for all Bristol Bay waters to protect spawning Chinook salmon.

In 2001, a statewide regulation (5 AAC 67.010 (b)) created a daily bag and possession limit for Chinook salmon under 20 inches of 10 per day in all fresh waters open to Chinook salmon sport fishing, except for the Nushagak River drainage. The limit is in addition to the daily limits for Chinook salmon 20 inches or longer. Chinook salmon under 20 inches do not count toward the annual limit and are in addition to the daily bag limit for Chinook salmon 20 inches or longer. The sole exception is the Nushagak River, which has a daily bag and possession limit of 5 Chinook salmon under 20 inches per day.

In the drainages of the Alagnak, Egegik, Kvichak, Igushik, Naknek, Snake, Togiak, and Ugashik rivers, the bag and possession limits for Chinook salmon are uniform at 3 per day, 1 of which may exceed 28 inches in length (5 AAC 67.020 (1)).

Anglers are prohibited from removing a Chinook salmon from the water before releasing the fish in all fresh waters of Bristol Bay. Any Chinook salmon removed from the water must be kept and becomes part of an angler's daily bag limit. The goal of this regulation is to improve the potential survival of released Chinook salmon and to encourage anglers to be more careful with the fish they release.

Table 6 lists the chronology of the bag limit regulatory changes affecting Chinook salmon sport fisheries in all drainages of Bristol Bay.

Table 6.–Bag limit regulatory changes affecting Chinook salmon in the BBMA.

Effective year	Regulation
1965	10 salmon (all species combined) per day, no size limit
1972	5 king per day, only 2 may be over 26 inches
1976	5 king per day, only 2 may be over 28 inches
1988	3 king per day, only 2 may be over 28 inches
1998	Daily bag and possession limits on several waters reduced to 3 per day, only 2 over 28 inches.
	Annual limit of 5 king salmon.
	Spawning closures for all waters.
2001	Daily bag and possession limits on most Eastern and most Central section waters (except Nushagak and Wood River drainages) reduced to 3 per day, only 1 over 28 inches.
	All waters except Nushagak drainage allow harvest of 10 per day under 20 inches.
	All fish released must remain in the water from Cape Menshikof to Cape Constantine.
2003	All fish released must remain in the water from Cape Menshikof to Cape Pierce.
	Harvest of 5 per day under 20 inches allowed in the Nushagak drainage.
2012	Bag and possession limit for king salmon in all drainages from Cape Constantine to Cape Newenham changed to 3, only 1 fish over 28 inches in length.

Note: Chinook salmon are referred to as king salmon in the regulatory language.

NAKNEK RIVER

Fishery Description

The Naknek River (Figure 3) is located on the Alaska Peninsula near the communities of King Salmon, Naknek, and South Naknek. The Naknek River Chinook salmon sport fishery commences May 1 and continues through July 31, when it closes by regulation to protect spawning fish. The peak angling weeks are from about June 22 to July 14. Effort is concentrated in a 12-mile stretch of the Naknek River adjacent to the community of King Salmon. This fishery is one of the most popular sport fisheries in the area and accounts for roughly 21% of all the Chinook salmon harvested by sport fishermen in the BBMA. Several factors contribute to the popularity of the Naknek River, including ease of access and regularly scheduled airline service into King Salmon. This fishery has a significant amount of unguided effort, reasonably good catch rates, and a relatively high retention rate. Of the estimated catch of 3,482 Chinook salmon in 2014, 1,071 or nearly 31% were kept[2].

Based on the SWHS, the estimated Chinook salmon sport harvest from 2004 through 2014 ranged from a high of 3,004 in 2004 to a low of 1,071 in 2014, with an average of 1,907 fish from the Naknek River drainage (Table 5). Angler effort for all species on the Naknek River has decreased from highs of over 20,000 angler-days in the early 2000s to a 5-year average of 14,714 (2009–2013; Table 1).

Based on freshwater logbook data from 2009 through 2013, guided effort has remained fairly stable with an average of 3,695 angler-days (Table 2).

Fishery Management and Objectives

In 2006, the escapement goal for Naknek River Chinook salmon was changed to a sustainable escapement goal (SEG) of 5,000 Chinook salmon as assessed by aerial survey. While managing for the escapement, consideration is also given to maintaining the historical distribution of spawners within the 4 primary spawning areas of Pauls Creek, King Salmon Creek, Big Creek, and the mainstem of the Naknek River near Rapids Camp.

Sport harvests and effort are estimated through the SWHS and are reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Commercial and subsistence harvests are monitored by the Division of Commercial Fisheries (CF) and are reported in the ADF&G Annual Management Report series (Elison et al. 2015). The Division of Sport Fish (SF) has also conducted significant monitoring and stock assessment projects (Coggins and Bingham 1993; Gryska and Naughton 2001).

Escapement of Chinook salmon is estimated by fixed-wing aerial surveys of the 4 primary spawning areas during the presumed peak of spawning in early to mid-August. Aerial counts are left unexpanded and are considered minimum estimates of escapement. Results of the escapement surveys indicate the mainstem of the Naknek River, along with Big Creek, comprises approximately 90% of the observed escapement. Except in 2000 and 2015, recent

[2] Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish [cited October 14, 2015]

escapements have generally met or exceeded the escapement goal. Surveys were not conducted from 2010 through 2014 due to budget shortfalls.

Table 7.–Chinook salmon commercial, subsistence and sport harvest plus escapement for the Naknek River, 1995–2015, including 1985–1994 average.

	Harvest				Escapement
Year	Commercial [a]	Subsistence [b]	Sport	Total	index [c]
1995	5,130	1,431	4,153	10,714	4,960
1996	4,273	1,574	2,984	8,831	5,010
1997	3,132	2,764	4,231	10,127	10,453
1998	2,722	2,433	3,443	8,598	5,505
1999	1,439	1,567	2,856	5,862	NA
2000	1,077	894	2,105	4,076	3,233
2001	995	869	2,656	4,520	6,340
2002	1,002	837	2,170	4,009	7,593
2003	611	1,221	2,412	4,244	6,081
2004	1,496	1,075	3,004	5,575	12,878
2005	1,458	1,047	2,140	4,645	NA
2006	2,333	881	2,558	5,772	NA
2007	1,520	672	1,431	3,623	5,498
2008	1,344	719	1,285	3,348	5,390
2009 [d]	1,026	392	2,279	3,697	NA
2010 [d]	1,060	422	1,266	2,748	NA
2011 [d]	1,962	550	2,416	4,928	NA
2012 [d]	2,306	785	2,288	5,379	NA
2013 [d]	1,360	502	1,242	3,104	NA
2014 [d]	1,526	530	1,071	3,127	NA
Average					
1985–1994	5,508	1,329	4,362	11,199	6,065
1995–2014	1,889	1,058	2,400	5,346	6,631
2010–2014	1,643	558	1,657	3,857	NA
Percent					
1995–2014	35%	20%	45%		
2010–2014	43%	14%	43%		
2015 [e]	740	NA	NA	NA	3,305

Sources: Commercial: Jones et al. 2014; Elison et al. 2015: Appendix A4. Sport: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Naknek–Kvichak district commercial harvests likely include Naknek, Alagnak, and Kvichak stocks. The harvests reported for Naknek River stocks are therefore considered maximums.

[b] Naknek–Kvichak District harvests.

[c] Actual raw counts made from fixed wing aerial surveys.

[d] No escapement surveys conducted due to budget constraints.

[e] Aerial survey was conducted by an inexperienced surveyor and is considered a minimum extimate.

Concern over low escapements and increasing sport harvest prompted the 1987 BOF to adopt a regulation package addressing Naknek River Chinook salmon. The key elements of that package included the following:

1) establishing a season for Chinook salmon (May 1 to July 31),
2) artificial-lure-only designation, and
3) reduction in bag and possession limits to 3 per day, 1 of which may be over 28 inches.

Beginning in the early 1990s, increasing portions of Pauls and King Salmon creeks were closed to Chinook salmon fishing to protect spawning stocks in these waters. In 1995, the outlets of Pauls and King Salmon creeks into the Naknek River were closed to angling to protect important holding areas for Chinook salmon.

In 1997, closures to Chinook salmon angling in Pauls and King Salmon creeks were clarified, and an annual limit of 5 Chinook salmon per angler was adopted for this fishery. The annual harvest limit was areawide in the BBMA and required anglers to record the date and location of each Chinook salmon taken.

With the advent of the annual limit on Chinook salmon, a number of local anglers had expressed strong interest in taking smaller Chinook salmon on the Naknek River. In January 2001, the BOF added the opportunity to harvest 10 Chinook salmon per day under 20 inches in length and prohibited anglers from removing Chinook salmon from the water if the fish were to be released[3]. During the January 2001 meeting, the BOF also restricted most of Big Creek to catch-and-release angling for Chinook salmon. The Big Creek regulation grew from a locally generated proposal designed to address concerns for the Big Creek Chinook salmon escapement. In 2013, Big Creek and waters of the Naknek River drainage within a one-quarter mile radius of its confluence with Big Creek were closed to sport fishing for Chinook salmon.

As described earlier in this report, a particular concern for some Naknek River anglers is the management of the Naknek–Kvichak District commercial sockeye salmon fishery. When conservation concerns for the Kvichak River sockeye salmon stocks require area restrictions in the Naknek–Kvichak District, commercial fishing may be allowed in the lower reaches of the Naknek River under the terms of the Naknek River Sockeye Salmon Special Harvest Area Plan (NRSHA; 5 AAC 06.360). The plan was adopted by the BOF in 1986. This management strategy can result in a higher percentage of the Naknek River escapement being exposed to gill nets, raising the concern of a number of guides and anglers. The BOF has amended the plan several times and in 2001 adopted amendments to address the quality of salmon of all species escaping through the NRSHA openings.

2015 Season

Sport fishing effort, catch, and harvest will not be available until 2016; however, anglers reported that sport fishing for Chinook salmon on the Naknek River was good in 2015. Escapement counts (3,060 fish) were well below the historical average; however, this may be partially attributed to an inexperienced surveyor and less than ideal counting conditions.

[3] Alaska sport fishing regulations summary—Bristol Bay drainages (effective April 15, 2015 through April 14, 2016) Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.

Commercial harvest of Chinook salmon in the Naknek–Kvichak District during 2015 was approximately 740.

ALAGNAK (BRANCH) RIVER

Fishery Description

The Alagnak River (Figure 3), known locally as the Branch River, is located in the Kvichak River drainage, approximately 40 miles north of the community of King Salmon. The Alagnak River's proximity to the community of King Salmon makes it an attractive alternative to fishing the more crowded Naknek River. In addition, it is the closest Chinook salmon fishery for many of the lodges near Iliamna Lake, where few Chinook salmon spawn. The Chinook salmon fishery in the Alagnak River occurs mainly in the lower 15 miles of the river and peaks in mid to late July, roughly 2 weeks later than other Chinook salmon fisheries in the area. Chinook salmon returning to the Alagnak River are typically larger than those found in other systems. Effort is primarily guided (about 80%), nonresidents (more than 90%; Dunaway 1990a, 1994; Naughton and Gryska 2000). Most anglers either fly in with float-equipped aircraft for 1-day trips or base themselves in one of several lodges located along the river. Retention rates average approximately 20% (Dunaway 1990a, 1994; Naughton and Gryska 2000), typical of most of the area's Chinook salmon fisheries.

From 2004 through 2013, the largest estimated annual harvest of Chinook salmon from the Alagnak River was 1,317 fish in 2011 (Jennings et al. 2015). From 2009 through 2013, the average harvest of Chinook salmon in the Alagnak River was 654 fish (Table 5). The 2014 harvest of 983 fish was above the recent average (Table 5). The 2014 total estimated effort of 6,013 angler-days also exceeded the 2009 through 2013 average effort of 5,516 angler-days (Table 1).

Based on freshwater logbook data from 2009 through 2013, guided effort has declined from a peak of 5,066 in 2006 to a low of 2,462 in 2012, with an average of 2,812 angler-days (Table 2).

Unexpanded escapement index counts of Chinook salmon in the Alagnak River averaged 3,320 fish from 2005 through 2014 (Table 8).

Fishery Management and Objectives

Alagnak River drainage Chinook salmon fisheries are managed to achieve a sustainable escapement goal (SEG) of 2,700 Chinook salmon as assessed by aerial survey.

Sport harvests and effort are estimated through the SWHS and are reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Commercial and subsistence harvests are monitored by CF and are reported in the ADF&G Annual Management Report series (Elison et al. 2015). Commercial harvests are reported for the Naknek–Kvichak District, which is a mixed-stock fishery composed of Kvichak, Naknek, and Alagnak river stocks. It is not possible to separate the commercial harvests by river of origin. SF has conducted significant monitoring and stock assessment projects on the Alagnak River in the recent past (Brookover 1989; Dunaway 1990a, 1994; Naughton and Gryska 2000).

Table 8.–Unexpanded escapement counts and total sport fishing effort and harvest of Chinook salmon in the Alagnak River, 1995–2015, including 1985–1994 average.

Year	Index count [a]	Total effort	Harvest
1995	6,860	13,232	891
1996	9,885	8,121	931
1997	15,210	11,062	972
1998	4,148	7,715	1,531
1999	2,178	6,411	592
2000	2,220	7,589	501
2001	5,458	4,391	508
2002	3,765	7,886	305
2003	8,209	9,956	334
2004	6,755	8,267	1,146
2005 [b]	5,084	11,228	1,008
2006 [b]	4,278	11,747	1,052
2007 [b]	3,455	8,881	1,007
2008	1,825	8,652	394
2009	1,957	5,541	199
2010 [c]	NC	6,459	405
2011	NC	5,669	1,317
2012	NC	5,039	572
2013	NC	4,782	823
2014	NC	6,013	983
Average			
1985–1994	4,362	6,715	945
2005–2014	3,320	7,401	776
2015 [d]	917	NA	NA

Source: Total effort and Harvest: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Maximum index count; escapement goal is 2,700.

[b] Commercial fishing occurred in the Alagnak River Special Harvest Area.

[c] Emergency order issued July 15 reducing the bag limit to 1 fish over 20 inches and the seasonal limit to 3.

[d] Escapement survey conducted by an inexperienced surveyor and considered a minimum estimate.

Management concerns for Chinook salmon stocks of the Alagnak River drainage center on an inability to estimate total exploitation rates. Allocation of commercial catches from the Naknek–Kvichak District to the river of origin is not yet possible, and the lack of inseason assessment of escapement makes it difficult to effectively manage this stock. Run timing of Chinook salmon stocks to the Alagnak River coincides with peak periods of commercial sockeye salmon fishing in the Naknek–Kvichak District. When sockeye salmon runs are sufficient to allow for liberal fishing schedules, the potential for substantial incidental harvest of the Alagnak River Chinook salmon stocks exists.

Terminal tackle in this river system has been restricted for many years to single-hook artificial lures only to protect rainbow trout. Through 1988, the bag and possession limits for Chinook salmon in the Alagnak River were 5 fish, only 2 over 28 inches in length. From 1989 through 1997, the limits were 3 fish, only 2 over 28 inches in length. Finally, in addition to a 5 fish

annual limit and a spawning season closure on July 31, the BOF established a daily bag and possession limit of 3 fish, only 1 of which could exceed 28 inches in length[4]. As mentioned in the introduction of this section, in January 2001, the BOF added the opportunity to harvest 10 Chinook salmon under 20 inches in length per day and prohibited anglers from removing Chinook salmon from the water if the fish were to be released.

2015 Season

Based on recent returns and low productivity of Chinook salmon stocks statewide, a below average to average run of Chinook salmon was expected to the Alagnak River drainage. However, information from anglers and guides indicated that angling success in the sport fishery was above average. Aerial surveys counted 917 Chinook salmon within the drainage index areas, less than half the long term average (Table 8); however, this is considered a minimum estimate because the surveyor was relatively inexperienced and counting conditions were less than ideal. Estimates of sport fishing effort, catch, and harvest will not be available until 2016.

NUSHAGAK AND MULCHATNA RIVERS

Fishery Description

The Nushagak River drainage (Figure 3) supports the largest sport, commercial, and subsistence fisheries for Chinook salmon in the BBMA (Tables 5 and 9).

Sport fishing effort is concentrated in 3 areas: the lower Nushagak River near the village of Portage Creek, the middle section of the Nushagak River in the vicinity of the village of Ekwok, and the midsection of the Mulchatna River between the Stuyahok and Koktuli rivers. Between 1992 and 1997, effort in the Ekwok area was highly variable. Since about 1999, the lower river fishery has begun to expand steadily upriver to Ekwok and the 2 areas are merging into a single fishery. The amount of angling for Chinook salmon in the middle section of the Mulchatna River seems to have diminished since bait was prohibited there in 1992. Although sport fishing for Chinook salmon does occur in some of the tributaries of the drainage, the overall impact of that activity, in terms of harvest, is considered slight.

The uplands along much of the Nushagak River are privately owned. Choggiung Limited, an Alaska Native village corporation, administers a recreational land management program. Since its inception in the mid-1980s, this program has grown to include the lands of the adjoining villages of Ekwok, New Stuyahok, and, in some years, Koliganek. Private and commercial land-use permits sold by the program allow anglers access to desirable campsites while engaged in recreational fishing and hunting.

[4] Alaska sport fishing regulations summary—Bristol Bay drainages (effective April 15, 2015 through April 14, 2016) Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.

Table 9.–Chinook salmon commercial, subsistence, sport harvest, and escapement for the Nushagak River drainage, 1989–2015.

		Harvest below sonar				Harvest above sonar		Spawning escapement	
Year	Total run [a]	Commercial harvest [b]	Subsistence harvest [c]	Sport harvest [d]	Inriver sonar estimate	Subsistence Harvest [e]	Sport Harvest [f]	Sonar estimate [g]	Aerial survey estimate
1989	102,241	17,637	4,898	1,404	78,302	2,217	2,210	73,875	
1990	85,792	14,812	6,228	797	63,955	3,325	2,689	57,941	
1991	132,769	19,718	6,907	1,793	104,351	3,127	3,758	97,466	
1992	139,943	47,563	7,688	1,844	82,848	2,499	2,911	77,438	
1993	173,747	62,976	10,552	2,408	97,812	2,919	3,492	91,401	
1994	332,388	119,480	8,829	4,436	199,643	6,661	6,191	186,792	
1995	268,137	79,943	7,810	2,238	178,146	5,891	2,713	169,542	
1996	192,011	72,123	9,086	2,346	108,456	6,855	3,045	98,557	
1997	156,052	64,390	8,731	931	170,610	6,587	2,567		82,000
1998	370,908	117,820	6,987	1,640	244,461	5,271	4,188	235,003	
1999	147,530	11,178	5,732	934	129,686	4,325	3,304	122,058	
2000	136,194	12,120	5,398	1,389	117,288	4,072	4,628	108,588	
2001	212,037	11,746	6,703	1,600	191,988	5,057	4,299	182,632	
2002	228,969	40,039	6,430	1,193	181,307	4,851	2,500	173,956	
2003	222,846	43,485	10,651	2,203	166,507	8,035	3,752	154,720	
2004	350,407	96,759	8,898	2,567	242,183	6,712	4,339	231,132	
2005	306,892	62,764	7,142	2,863	234,123	5,387	5,702	223,034	
2006	218,413	84,881	5,683	3,166	124,683	4,288	4,307	116,088	
2007	121,959	51,831	7,598	3,581	60,464	5,732	6,088	48,644	
2008	126,301	18,968	7,387	3,305	96,641	5,573	3,395	87,673	
2009	115,884	24,693	7,260	2,451	81,480	5,477	3,903	72,100	
2010	69,556	26,056	5,216	1,659	36,625	3,935	2,248	30,443	
2011	95,300	26,927	7,103	1,542	59,728	5,358	3,302	51,068	
2012	129,282	11,952	7,711	1,833	107,786	2,639	4,098	101,049	
2013	133,246	10,213	6,613	1,971	113,709	4,989	4,714	104,746	
2014	90,717	11,448	6,418	2,369	70,482	4,842	3,891	61,749	

-continued-

Table 9.–Page 2 of 2.

		Harvest below sonar				Harvest above sonar		Spawning escapement	
Year	Total run [a]	Commercial harvest [b]	Subsistence harvest [c]	Sport harvest [d]	Inriver sonar estimate	Subsistence Harvest [e]	Sport Harvest [f]	Sonar estimate [g]	Aerial survey estimate
Average									
1989–2014	179,212	44,674	7,295	2,095	128,587	4,870	3,778	118,308	
2010–2014	103,620	17,319	6,612	1,875	77,666	4,352	3,651	69,811	
Percent									
1989–2014		40%	22%	8%		17%	13%		
2010–2014		51%	20%	6%		13%	11%		
2015	NA	48,803	NA	NA	98,019	NA	NA	NA	

Source: Commercial harvest (total Nushagak District): 1989-1993 Jones et al. (2010: Appendix A19); 1994–2014 Elison et al. (2015: Appendix A19). Subsistence harvests above and below sonar: ADF&G Subsistence Division, Subsistence Database from Charles Utermohle, Program Coordinator, Subsistence Division, Region II, Anchorage, Nov. 20, 2000. Data for 2000–2008 provided by James Fall, Subsistence Division, Region II, Anchorage. Sport harvests above and below the sonar: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services). Sonar estimates: 1989–1993 Jones et al. (2010: Appendix A19); 1994–2014 Elison et al. (2015: Appendix A19).

[a] Run refers to an aggregation of salmon of all ages returning from ocean feeding grounds to spawn in any given year.

[b] Total Nushagak District commercial harvest.

[c] Includes Nushagak Bay and Igushik.

[d] Sport harvest total for 1989 to 1996 is 50% of the Nushagak River system sport harvest. Sport harvest total for 1997 to 2009 is Nushagak River sport harvest from Black Point to sonar.

[e] Includes Ekwok area, Iowithla River, Klutuk River, Koliganek area, New Stuyahok area, Portage Creek area, Kokwok area, Mulchatna River, and an unknown Nushagak River watershed site.

[f] Sport harvest total for 1989 to-1996 is 50% of the Nushagak River system sport harvest plus the Mulchatna River system, Tikchik-Nuyakuk rivers, and Koktuli River sport harvests. Sport harvest total for 1997 to 2001 is 50% of the Nushagak River harvest plus the Black Point to Iowithla River, Nushagak River upstream of Iowithla River, Mulchatna River system, Tikchik–Nuyakuk rivers and the Koktuli River harvests. Sport harvest total for 2002 to 2011 is Nushagak River excluding Black Point to sonar.

[g] Sonar estimates for 1989 to 1996, and 1998 to 2014 are sonar estimates minus subsistence and sport harvest above sonar.

Chinook salmon stocks in the Nushagak–Mulchatna drainage have been variable in recent years. The 2009, 2010, 2011, and 2014 runs were well below average and did not achieve the inriver goal. The 2012, 2013, and 2015 runs were above average and exceeded the inriver goal. Total runs of Nushagak and Mulchatna rivers Chinook salmon averaged 103,620 fish from 2010 through 2014, ranging from 69,556 to 133,246 fish (Table 9).

Total harvest by commercial, subsistence, and sport fisheries averaged 33,809 Chinook salmon from 2010 through 2014 (calculated from Table 9). The majority (51%) of the harvest was taken by the commercial fishery, 33% was taken by the subsistence fishery, and 17% by sport anglers (Table 9). Sport harvest of Chinook salmon averaged 5,526 fish from 2010 through 2014 (calculated from Table 9).

Based on freshwater logbook data from 2006 through 2013, guided effort downstream of the Mulchatna River has been variable, with a low of 3,920 angler-days in 2010 and a high of 8,559 angler-days in 2006. From 2009 through 2013, effort averaged 5,304 angler-days (Table 2).

Chinook salmon escapement into the Nushagak and Mulchatna rivers was estimated by aerial surveys beginning in 1967. Since 1987, sonar has been used to estimate the inriver run of Chinook salmon to the Nushagak River drainage. The sonar is considered an improvement over the aerial survey program because it gives a real-time estimate of escapement on which management decisions can be based.

Fishery Management and Objectives

Under the *Nushagak and Mulchatna King Salmon Management Plan* (5 AAC 06.361, adopted January 1992, amended December 1994, November 1997, January 2001, December 2003, and December 2012; Table 10), Chinook salmon are managed to attain an inriver run of 95,000 fish, which is expected to provide 55,000 to 120,000 spawning fish per year, a reasonable opportunity to harvest Chinook salmon in the inriver subsistence fishery, and a guideline harvest level in the sport fishery of 5,000 fish. If the inriver run exceeds 95,000 Chinook salmon, then the guideline harvest level does not apply. If the inriver run falls below 95,000 Chinook salmon, then restrictive actions are required for the sport fishery. If the inriver run falls below 70,000 Chinook salmon, then additional restrictive actions are required for the sport fishery. If the inriver run falls below 55,000 Chinook salmon, the sport fishery is to be closed and the subsistence fishery may be restricted.

Since 1972, smaller runs and increasing sport fishing effort have prompted restrictive actions on the inshore commercial and sport fisheries. To remain within the sport fishery guideline harvest level of 5,000 fish, the bag and possession limit is 2 Chinook salmon per day, of which only 1 may be longer than 28 inches in length (ADF&G 2009). Only 4 of the 5 Chinook salmon allowed in an angler's Bristol Bay annual harvest may come from the Nushagak–Mulchatna drainage. Additionally, in the Nushagak–Mulchatna drainage, there is a bag and possession limit of 5 per day for Chinook salmon under 20 inches. Chinook salmon under 20 inches do not count toward the annual limit of 4 and are in addition to the daily bag limit for Chinook salmon 20 inches or longer. Due to concerns over catch-and-release mortality, BOF adopted regulations in 2012 requiring anglers to use single hooks and, after harvesting a bag limit, to use only unbaited, single-hook, artificial lures for the remainder of that day.

Table 10.–A chronology of significant regulation changes for the Nushagak and Mulchatna rivers.

Effective year	Regulation
1990	Sport season established from January 1 to July 25 upstream of and including the Iowithla River. Spawning season closure adopted to afford drainagewide protection to spawning king salmon stocks.
1992	Gear restricted to single-hook artificial lures for the portion of the Mulchatna River between the Koktuli and Stuyahok rivers.
1992	*Nushagak and Mulchatna King Salmon Management Plan* (5 AAC 06.361) is adopted, capping the sport harvest at 5,000 fish and establishing an escapement projection of 65,000 as the trigger for inseason restrictions in the sport fishery.
1994	*Nushagak and Mulchatna King Salmon Management Plan* (5 AAC 06.361) is amended, setting the sport allocation as a guideline harvest rather than a cap.
1997	*Nushagak and Mulchatna King Salmon Management Plan* (5 AAC 06.361) was amended, by establishing an escapement projection of 55,000 king salmon below which inseason restrictions in the sport fishery must be imposed. The 55,000 fish "trigger" was adopted when analysis showed this escapement level was not likely to show a difference in the expected productivity versus that expected at the 65,000 fish trigger. In addition, the 65,000 fish "trigger" had become quite disruptive to the sport fishery by precipitating frequent inseason restrictions.
1997	The daily bag and possession limit was reduced to 2 king per day, only 1 over 28 inches. An annual harvest limit of 4 king salmon was adopted for the whole Nushagak–Mulchatna rivers drainage.
1997	Guides were prohibited from retaining any species of fish while guiding (all Bristol Bay.)
1997	The Kokwok River and the Nushagak River upstream from its confluence with Harris Creek were closed to angling for king salmon.
1997	A July 31 spawning season closure was adopted for the Nushagak River drainage downstream from the Iowithla River outlet.
1997	The commercial fishery was to be managed to allow pulses of king salmon to enter the Nushagak River untouched.
2001	The Alaska Board of Fisheries amended the management plan to allow a catch-and-release fishery when the final inriver abundance is projected to be below 55,000 fish but above 40,000 fish. The amended plan also stipulates that when the king salmon sport fishery is restricted to catch-and-release or is closed for conservation, the use of bait must be prohibited.
2001	A regulation allowing a daily bag limit of 10 king salmon less than 20 inches total length (508 mm TL) statewide, specifically excluded the Nushagak–Mulchatna rivers drainage until ADF&G could study the potential effects of the regulation on the spawning populations and the escapement goal.
2001	As with most other Bristol Bay drainages, the Nushagak River drainage was included in the regulation prohibiting anglers from removing king salmon from the water if the fish were to be released.
2003	A daily bag and possession limit for king salmon under 20 inches of 5 per day is implemented on the Nushagak drainage. King salmon under 20 inches do not count toward the annual limit of 4 and are in addition to the bag limit for king salmon 20 inches or longer. The *Nushagak and Mulchatna King Salmon Management Plan* (5 AAC 06.361) was amended so that if inriver projections fall below 75,000, a bag limit of 1 per day, 1 in possession, no size limit, is imposed on the sport fishery. The seasonal limit would not be adjusted.
2012	The Alaska Board of Fisheries adopted the following regulations: from May 1 to July 31 only 1 single-hook or single-hook lure may be used and the use of bait is allowed UNTIL an angler harvests a daily bag limit of king salmon 20 inches or greater in length, then that angler can only fish with 1 UNBAITED, single-hook or single-hook lure for the remainder of that day. Additionally, the numbers in the *Nushagak and Mulchatna King Salmon Management Plan* were updated to reflect counts from the new dual frequency identification sonar counter.

Note: Chinook salmon are referred to as king salmon in the regulatory language.

Sport harvests and effort are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2001b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Commercial and subsistence harvests are monitored by CF and are reported in the ADF&G Annual Management Report series (Elison et al. 2015).

2015 Season

Due to uncertainty with past estimates of escapement, there was no preseason forecast for the 2015 Nushagak and Mulchatna rivers Chinook salmon run. Additionally, due to low runs of Nushagak and Mulchatna rivers Chinook salmon in recent years and poor performance of Chinook salmon stocks statewide, in 2015 a conservative management approach seemed warranted. However, inriver escapement projections remained above the inriver goal throughout the entire season and, in accordance with the *Nushagak and Mulchatna King Salmon Management Plan*, no inseason restrictions were implemented on the sport fishery. The preliminary total estimate of Chinook salmon passing the sonar was 98,019 fish (Table 9). No directed Chinook salmon commercial fishing periods allowing large mesh gillnets occurred in the Nushagak District. Approximately 48,803 Chinook salmon were harvested incidentally during commercial sockeye salmon fishery openings (Table 9). Harvest estimates for the sport and subsistence fisheries are not yet available, but anecdotal information suggests that average to above average harvests occurred in both fisheries. By assuming that the sport harvest in 2015 was near the guideline harvest level of approximately 5,000 fish and that an average subsistence harvest of approximately 11,000 fish occurred, the 2015 total run was probably about 163,000 Chinook salmon. This total is significantly larger than the 2010 through 2014 average total run of 103,620 Chinook salmon (Table 9).

TOGIAK RIVER

Fishery Description

The Togiak River (Figure 3) is one of 3 major river systems within the Togiak National Wildlife Refuge. The relatively small Chinook salmon sport fishery on the Togiak River is concentrated along the lower 15 miles of the river and runs from late June through the month of July. The Togiak River supports the second largest Chinook salmon run in Bristol Bay, but its remote location, refuge regulations on guides, and ongoing friction between user groups have limited development of the fishery.

Based on SWHS estimates, the Chinook salmon sport harvest from 2010 through 2014 has ranged from a high of 2,166 in 2014 to a low of 591 in 2010 with an average of 1,191 fish from the Togiak River drainage (Table 11). Angler effort for the Togiak River drainage peaked in 2012 with a high of over 9,526 angler days; average effort for 2009–2013 was 4,859 angler-days (Table 1). During 2014, effort increased to 8,098 angler-days.

Based on freshwater logbook data from 2006 through 2013, guided angler-days have ranged from 873 in 2010 to 2,485 in 2006 with an average of 1,218 angler-days from 2009 through 2013 (Table 2).

Table 11.–Escapement and commercial (Togiak Section only), subsistence, and sport harvests of Chinook salmon from the Togiak River, 1995–2015, including 1983–1994 average.

	Harvest				
Year	Commercial	Subsistence	Sport [a]	Total	Escapement [b]
1995	10,768	448	581	11,797	12,600
1996	8,113	471	790	9,374	8,299
1997	5,357	667	1,165	7,189	10,300
1998	12,867	782	763	14,412	9,856
1999	10,830	1,244	644	12,718	9,520
2000	7,258	1,116	470	8,844	11,813
2001	9,518	1,612	1,006	12,136	13,110
2002	2,682	703	76	3,461	9,515
2003[e]	3,078	1,208	706	4,992	3,050 [c]
2004	7,673	1,094	1,388	10,155	12,324
2005	10,125	1,528	1,734	13,387	10,200
2006	15,078	1,630	1,064	17,772	NA
2007	7,142	1,234	1,501	9,877	NA
2008	2,891	1,337	892	5,120	2,140 [c]
2009	4,429	827	606	5,862	NA
2010	5,160	1,162	591	6,913	10,096
2011	5,780	966	1,438	8,184	2,140 [c]
2012	4,357	951	859	6,167	1,503
2013	2,458	691	900	4,049	NA
2014	1,477	919	2,166	4,562	3,994
Average					
1983–1994	15,725	690	280	16,695	13,740
1995–2014	6,852	1,030	967	8,849	8,154
2010–2014	3,846	938	1,191	5,975	4,433
Percent					
1995–2014	77%	12%	11%		
2010–2014	64%	16%	20%		
2015	2,896	NA	NA	NA	NA

Source: Commercial and subsistence: Elison et al. (2015). Sport: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Sport harvest from Togiak River system.

[b] Togiak River drainage total, estimated by aerial survey and expanded for missed fish.

[c] Aerial survey was incomplete; 3 sections of the mainstem and 2 tributaries were not surveyed.

Fishery Management and Objectives

Escapement of Chinook salmon into the Togiak River has been inconsistently estimated by aerial survey from fixed-wing aircraft since 1980. Aerial counts are expanded to account for missed fish and therefore represent total escapement estimates. Due to budget constraints, aerial Chinook salmon counts were not conducted by SF from 2010 through 2014. In 2006, the escapement goal for Togiak River Chinook salmon became a sustainable escapement goal (SEG) of 9,300 fish; however, due to a lack of annual escapement information, this goal was dropped in 2012.

Sport harvests and effort are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Commercial and subsistence harvests are monitored by the CF and are reported in the ADF&G Annual Management Report series (Elison et al. 2015). SF has conducted significant monitoring and stock assessment projects (Dunaway 1990b; Gryska and Naughton 2000).

In 1997, the BOF adopted several regulation changes that affected the Togiak Chinook salmon sport fishery. The May 1 through July 31 Chinook salmon sport fishery season was established by the BOF to protect spawning salmon. An annual limit of 5 Chinook salmon for sport anglers throughout Bristol Bay waters was adopted. In addition, guides were no longer allowed to harvest fish while guiding. These measures were designed to moderate the brief fishing season throughout the Bristol Bay drainage and to spread the harvest among more anglers. In 2012, the BOF reduced the area open to commercial fishing near the outlet of the Togiak River to minimize harvest of Chinook salmon.

2015 Season

Estimates of sport fishing effort, catch, and harvest will not be available until 2016; however, anglers reported that sport fishing for Chinook salmon on the Togiak River was above average in 2015. Commercial harvest was 2,896, well below the historic average of 6,852 (Table 11). Changes to the area open to commercial fishing, as well as low levels of effort, likely contributed to the lower than average harvest.

COHO SALMON FISHERIES

AREAWIDE FISHERY DESCRIPTION

Coho salmon are a very popular component of the Bristol Bay sport fishery. Coho salmon fisheries occur from late July through September with some isolated runs of fish available into October. While many BBMA anglers pursue coho salmon with the assistance of a guide, this readily caught species is quite popular with unguided anglers. Given the run timing, this species often serves as a popular activity for hunters and rainbow trout anglers visiting the area. Significant fisheries occur in the Alagnak, Egegik, Mulchatna, Naknek, Nushagak, Togiak, and Ugashik rivers, as well as a host of smaller, lesser known waters (Figure 4).

The Bristol Bay commercial fishery generally takes the majority of the area's annual coho salmon harvest. Since 1994, the annual commercial harvest ranged from 13,474 to 287,048 coho salmon with an average of 78,753 fish harvested annually (Elison et al. 2015). Subsistence harvests from 2004 through 2013 averaged over 6,500 coho salmon annually (Elison et al. 2015). From 2009 through 2013, the annual estimated sport harvest averaged 13,786 coho salmon and reached a peak of 16,722 fish in 2012 (Table 12). In 2014, anglers harvested 20,699 fish (Table 12).

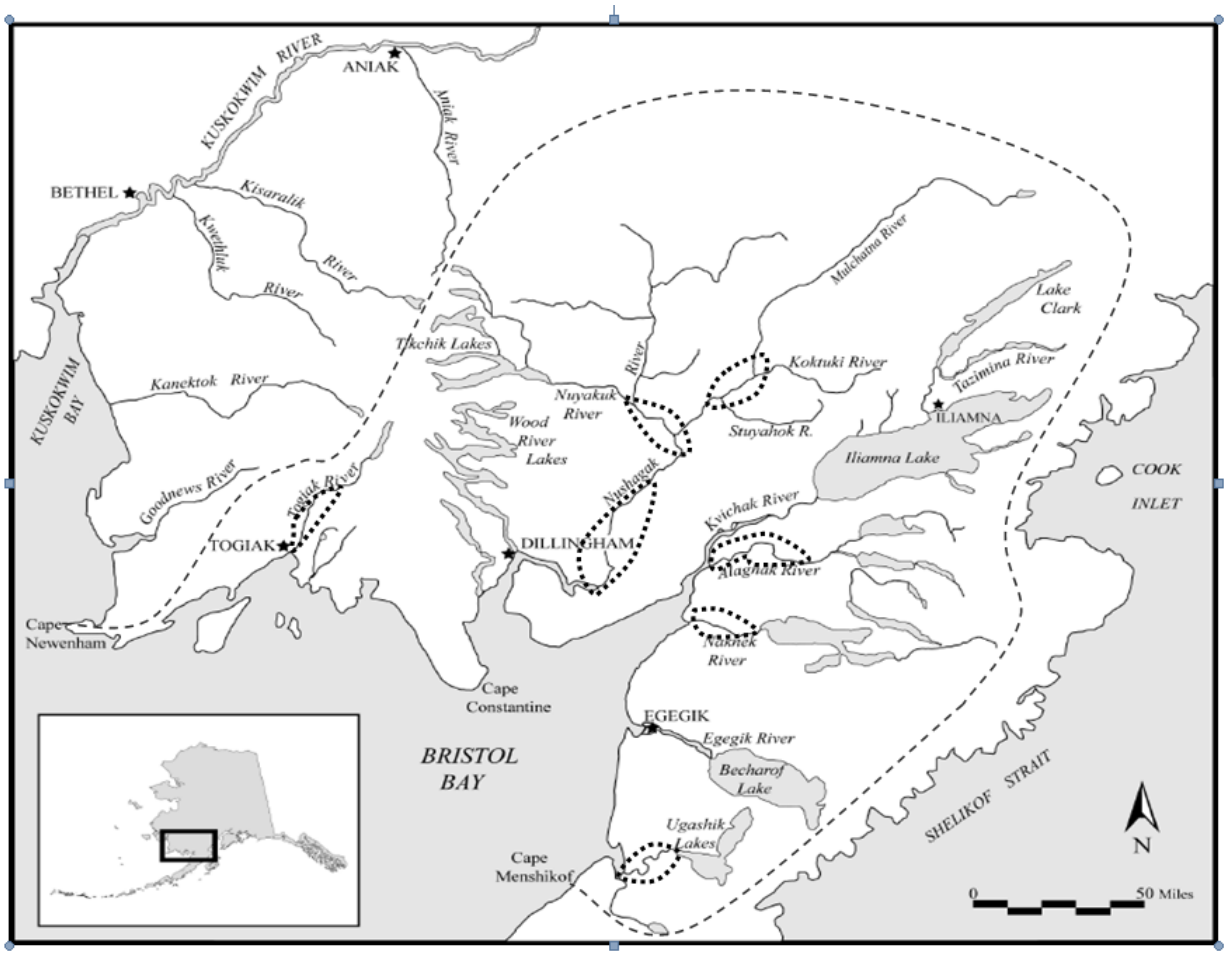

Figure 4.–Popular coho salmon sport fisheries (delineated with dark square dots) in the Bristol Bay Management Area.

AREAWIDE MANAGEMENT AND OBJECTIVES

Annual estimates of harvest (Jennings et al. 2004, 2006 a, 2006b, 2007, 2009 a, 2009b, 2015; Romberg et al. *In prep*) indicate that despite the 5 fish daily bag limit (in most waters), on average coho salmon are harvested in similar numbers as Chinook salmon, which have more restrictive bag limits (compare Table 5 to Table 12). Except for the Kvichak River drainage, where the limit is 2 coho salmon per day, and the Alagnak River drainage, where the limit is 3 per day, the limits for coho salmon are 5 salmon per day with no size limit. The 5-per-day limit has been in effect since 1972. The lower limits for the Kvichak and Alagnak rivers drainage were adopted during the 1997 BOF meetings (first effective in the 1998 season) to protect the small runs in the Kvichak River system and to address modest runs and large angling effort on the Alagnak River. The lack of escapement data to establish biological escapement goals and harvest strategies for all user groups continues to be a concern.

Table 12.–Sport harvest of coho salmon from the waters of the BBMA by fishery, 2004–2014, including 1977–2003 average.

Section	Drainage	Average 1977–2003	Annual sport fishing harvest of coho salmon										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Eastern														
	Naknek R.	2,618	7,333	2,714	4,015	4,218	5,830	4,325	4,970	2,879	3,239	2,987	3,680	6,026
	Brooks R.	60	275	0	49	53	118	72	57	0	0	0	26	13
	Kvichak R.	263	594	1,186	700	588	1,070	839	1,031	1,212	1,300	715	1,019	235
	Copper R.	26	0	0	0	138	48	105	16	36	0	0	31	64
	Alagnak R.	512	1,550	756	1,466	493	1,022	785	764	819	892	1,030	858	1,754
	Newhalen R.	229	366	0	0	58	54	0	32	0	0	115	29	0
	Lake Clark	30	65	0	0	0	77	0	0	9	0	0	2	41
	Other	1,108	994	2,763	2,115	1,470	1,438	1,224	1,726	2,494	2,959	848	1,850	3,051
	Subtotal [a]	4,846	11,177	7,419	8,345	7,018	9,657	7,350	8,596	7,449	8,390	5,695	7,496	11,184
Central														
	Nushagak R.	716	2,814	1,835	1,810	2,399	6,390	3,371	2,261	2,997	5,076	3,318	3,405	5,319
	Mulchatna R.	191	181	244	546	460	29	31	111	127	106	114	98	246
	Agulowak R.	20	0	0	129	210	110	181	42	100	19	23	73	0
	Agulukpak R.	11	52	0	61	38	0	0	0	0	0	57	11	0
	Wood River L. [b]	444	799	857	628	752	182	636	378	1,038	482	1,479	803	410
	Tikchik L.–Nuyakuk R.	106	418	0	36	48	77	76	448	46	0	0	114	20
	Other	180	215	133	395	244	287	174	309	199	19	11	142	194
	Subtotal [a]	1,090	4,479	3,069	3,605	4,151	7,075	4,469	3,549	4,507	5,702	5,002	4,646	6,189
Western														
	Togiak R.	739	2,321	1,959	2,214	1,970	3,420	1,556	772	1,232	2,506	1,534	1,520	3,319
	Other	30	0	0	0	0	0	0	0	347	124	149	124	7
	Subtotal [a]	769	2,321	1,959	2,214	1,970	3,420	1,556	772	1,579	2,630	1,683	1,644	3,326
Total		6,705	17,977	12,447	14,164	13,139	20,152	13,375	12,917	13,535	16,722	12,380	13,786	20,699

Source: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Subtotals of averages may not be the sum of the drainages because information for some drainages is not available for some years.

[b] Wood River Lakes includes Lake Nunavaugaluk. Prior to 1998, Agulowak and Agulukpak rivers were included in Wood River Lakes.

UGASHIK RIVER DRAINAGE

Fishery Description

The Ugashik River drainage (Figure 4) is located on the Alaska Peninsula about 128 km south of the community of King Salmon. Much of the drainage is within the boundaries of the Alaska Peninsula National Wildlife Refuge. The local population center of Pilot Point, at the outlet of the Ugashik River, has a long history of a commercial fishing and subsistence based economy. The drainage has been well known for producing some of the biggest Arctic grayling in Alaska, as well as providing good angling for sockeye and coho salmon, and Dolly Varden and Arctic char. The Ugashik Lakes area is accessible only by float plane or by boat from the village of Ugashik and Pilot Point, 40 km downstream from the Lower Ugashik Lake outlet. Most angler effort is nonresident guided anglers who access the river by flying out from nearby area lodges for day-fishing trips.

Coho salmon angling in the drainage is popular from mid-August through early September and combines well with anglers seeking a mixed bag of Dolly Varden, Arctic char, and Arctic grayling. Available information suggests peak coho salmon run timing to the Ugashik drainage occurs in late August. The most popular fishing sites are the "Narrows," a short stream connecting upper and lower Ugashik Lake, the outlet of lower Ugashik Lake, and the outlets of larger streams where they flow into the big lakes.

The Ugashik River drainage has historically been a popular destination for coho salmon anglers from lodges in Bristol Bay, however recent angling effort in the drainage has decreased from over 2,000 angler-days during 1999–2001 to a 2010–2014 average of 1,496 angler-days (Table 13). The sport harvest of coho salmon decreased from a high of 921 in 2005 to a low of 72 in 2011 (Table 13).

Based on freshwater logbook data from 2009 through 2013, the average estimated coho salmon harvest by guided anglers from 2009 through 2013 was 80 fish from the Ugashik River drainage which includes the Ugashik, King Salmon, and Dog Salmon rivers (Table 4). Guided effort during the same period was stable and averaged 301 angler-days (Table 2).

Fishery Management and Objectives

Escapement of coho salmon in the Ugashik River drainage has been estimated with aerial surveys since 1981. Estimated escapement has ranged from 400 in 1991 to 20,100 in 2006; however, during many years the drainage survey was not completed due to poor weather and survey conditions (e.g., see Table 13). As a result, survey results are minimum estimates of escapement and do not provide a reliable index to assess Ugashik River drainage coho salmon escapement.

Sport harvests and effort are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Commercial and subsistence harvests are monitored by CF and are reported in the ADF&G Annual Management Report series (Elison et al. 2015).

2015 Season

Estimates of sport fishery effort, catch, and harvest will not be available until 2016; however, reports from anglers during the 2015 season indicated an average to above average coho salmon return. An aerial survey was not conducted to assess coho salmon escapement.

Table 13.–Angler effort and coho salmon harvest plus escapement for the Ugashik River drainage, 1995–2015, with 1977–1994 average.

		Harvest				
Year	Effort	Sport	Commercial	Subsistence	Total	Escapement [a]
1995	905	346	13,800	290	14,436	NA
1996	2,098	392	13,163	298	13,853	8,275
1997	2,551	631	7,156	311	8,098	9,400
1998	1,534	223	13,007	485	13,715	1,459
1999	2,008	830	2,289	271	3,390	10,210
2000	2,403	513	1,269	467	2,249	12,070
2001	2,471	690	976	357	2,023	4,540
2002	1,350	724	464	460	1,648	3,805
2003	1,317	529	994	392	1,915	19,670
2004	1,017	408	4,744	234	5,386	5,440
2005	882	921	8,162	249	9,332	9,850
2006	541	571	3,087	339	3,997	20,100
2007	1,393	336	1,954	281	2,571	3,500
2008	615	74	2,220	222	2,516	6,240
2009	868	233	2,602	131	2,966	NA
2010	1,390	251	407	135	793	NA
2011	1,844	72	84	136	292	4,900
2012	1,756	116	0	228	344	NA
2013	1,471	411	479	106	996	NA
2014	1,019	604	435	147	1,186	NA
Average						
1977–1994	1,278	243	28,952	342	29,537	9,907
1995–2014	1,472	444	3,865	277	4,585	8,533
2010–2014	1,496	291	281	150	722	9,947
Percent						
1995–2014		10%	84%	6%		
2010–2014		40%	39%	21%		
2015	NA	NA	NA	NA	NA	NA

Source: Effort and sport harvest: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services). Commercial and subsistence harvests: Elison et al. (2015). Escapement: estimates from ADF&G-Division of Commercial Fisheries Salmon Spawning Ground Surveys in the Bristol Bay, Alaska.

[a] Counts may be variable due to timing, conditions, etc. Escapement estimates were not made in 1995, 2009–2010, and 2012–2014 due to poor survey conditions.

NAKNEK RIVER

Fishery Description

The Naknek River coho salmon sport fishery (Figure 4) develops in late July and continues well into September. The peak period is normally from August 7 to August 21. Effort is concentrated along a 12-mile stretch of the Naknek River adjacent to the community of King Salmon, but significant and possibly increasing effort occurs upstream from Rapids Camp to Lake Camp. This fishery is the most popular coho salmon fishery in the area and provides significant recreational opportunity and economic benefit for the community of King Salmon. Most anglers in the coho salmon fishery are unguided and are not Alaskan residents (Gryska and Naughton 2001).

Harvests of coho salmon by the recreational fishery averaged 4,020 fish during 2010–2014 (Table 14). Harvest of coho salmon from the Naknek River since 2004 has ranged from a high of 7,333 coho salmon in 2004 to a low of 2,714 in 2005 (Table 14).

Based on freshwater logbook data from 2006 through 2013, guided effort has remained fairly stable with an average of 3,695 angler-days (Table 2).

In recent years, the fall commercial fishery has not been active and its impact on coho salmon has been modest to nonexistent. Most of the commercial take is incidental to the sockeye salmon fishery. Subsistence harvests of coho salmon have generally declined since 2008, reaching a low of 399 in 2013 (Table 14).

Fishery Management and Objectives

No biological escapement goal (BEG) has been established for Naknek River coho salmon stocks. Because of the lack of escapement information, it is impossible to assess fishery impacts on the total run. In addition, the commercial harvest occurs on stocks returning to 3 different major rivers, further confounding ADF&G's ability to calculate the spawner-return relationships needed to develop an escapement goal.

Sport harvests and effort are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Commercial and subsistence harvests are monitored by CF and are reported in the ADF&G Annual Management Report series (Elison et al. 2015). SF has conducted significant monitoring and stock assessment projects in the recent past (Minard and Brookover III 1988b; Minard 1989a; Coggins 1992; Dunaway and Fleischman 1996a; Gryska and Naughton 2001).

The present bag and possession limits for coho salmon on the Naknek River are 5 fish per day with no size limit; the same limit has been in effect since 1972. No adjustments to the Naknek River coho salmon fishery bag and possession limits have occurred by inseason emergency order since 1999. In 1999, the coho salmon returns were so poor throughout Bristol Bay that the coho salmon sport fishery was restricted by emergency order to 1 coho salmon per day beginning on August 23.

Management concerns for this fishery center on the lack of escapement data and the lack of a management goal or target for this fishery. Without a clearer management target, justification for adjusting fishing time in the various fisheries is tenuous.

2015 season

Sport fishing effort, catch, and harvest will not be available until 2016; however, reports from anglers during the 2015 season indicated an average to above average coho salmon return. Harvest in the commercial fishery was only 1,164 fish (Table 14). The low harvest in the commercial fishery was due to limited markets and no directed participation. No aerial escapement survey was conducted during 2015.

Table 14.–Coho salmon commercial, subsistence, and sport harvests from the Naknek River, 1995–2015, with 1971–1994 average.

	Harvest			
Year	Commercial	Subsistence	Sport	Total
1995	981	1,791	1,788	4,560
1996	3,601	1,482	4,754	9,837
1997	718	1,457	3,879	6,054
1998	1,587	1,592	2,547	5,726
1999	303	856	3,672	4,831
2000	952	937	3,549	5,438
2001	3	740	4,795	5,538
2002	0	943	4,756	5,699
2003	42	812	6,393	7,247
2004	2,142	566	7,333	10,041
2005	3,314	1,224	2,714	7,252
2006	5,163	720	4,015	9,898
2007	2,180	1,104	4,218	7,502
2008	7,059	1,437	5,830	14,326
2009	732	669	4,325	5,726
2010	901	645	4,970	6,516
2011	633	690	2,879	4,202
2012	431	485	3,239	4,155
2013	467	399	2,987	3,853
2014	618	578	6,026	7,222
Average				
1971–1994	7,634	844	1,781	12,830
1995–2014	1,591	956	4,233	6,781
2010–2014	610	559	4,020	5,190
Percent				
1995–2014	23%	14%	62%	
2010–2014	12%	11%	77%	
2015	1,164	NA	NA	NA

Source: Commercial and subsistence: Elison et al. (2015). Sport: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

NUSHAGAK–MULCHATNA DRAINAGE

Fishery Description

The Nushagak–Mulchatna rivers drainage (Figure 4) produces the largest runs of coho salmon in Bristol Bay. Within the drainage, there are 4 areas of concentrated recreational effort: the lower 15 miles of the Nushagak River near the village of Portage Creek, the middle section of the Nushagak River in the vicinity of the village of Ekwok, the section of the Mulchatna River

between the Stuyahok and Koktuli rivers, and the upper Nushagak River from the outlet of Nuyakuk River upstream to the outlet of the King Salmon River (Figure 4). Of the areas mentioned above, the lower portion of the Nushagak River and the fishery in the immediate vicinity of the Nuyakuk River outlet have long been the most significant. Although sport fishing for coho salmon occurs in some of the tributaries of the drainage, the overall harvest resulting from that activity is considered slight. The lower Nushagak River provides fishing opportunity for early coho salmon in late July and early August when other coho salmon fisheries have not yet begun. Increased guided rainbow trout angling as well as caribou hunting in the upper Nushagak River area may be responsible for increased coho salmon angling activity in this remote portion of the drainage. Combination hunting and fishing (coho salmon and rainbow trout) float trips have been popular for years in the Mulchatna River drainage.

Most recently, the sport fishing harvest has averaged 3,297 fish, or about 3% of the total harvest of Nushagak and Mulchatna coho stocks from 2010 through 2014 (Table 15). Commercial harvest accounted for 93% and subsistence 4% of the total annual harvest for the same period. Subsistence harvest has tended to increase since such harvests were first recorded. At the current levels, the coho salmon sport fishery is considered to have a minor impact on the overall productivity of Nushagak and Mulchatna rivers drainage coho salmon stocks.

Based on freshwater logbook data from 2006 through 2013, guided effort downstream of the Mulchatna River has been variable with a low of 3,920 angler-days in 2010 and a high of 8,559 angler-days in 2006. From 2009 through 2013 total effort averaged 5,304 angler-days (Table 2).

Fishery Management and Objectives

The Nushagak River coho salmon stocks are currently considered to be healthy. Since 1989, the 90,000 spawning fish escapement goal has been achieved in 6 years, although in 10 of those years, including 2015, the sonar did not operate during the coho salmon run due to budget shortfalls (Table 15). In the past, significant restrictions have been placed on all fisheries, including closure of the subsistence fishery, to reduce exploitation on this stock in poor years, such as 1999 when the inriver sonar estimate was the lowest on record since 1987 (Table 15). Recent runs have been well above average and the inriver and escapement goals have been exceeded. Current management of Nushagak and Mulchatna rivers coho salmon is governed by 5 AAC 06.368. *Nushagak River Coho Salmon Management Plan*, adopted by the BOF in December of 1995. The plan calls for managing the commercial fishery for an inriver run of 100,000 coho salmon, which provides for a spawning escapement of 90,000 fish, a reasonable opportunity in the subsistence fishery, and a 2,000 fish guideline harvest in the sport fishery. The plan addresses management actions that should be taken should the inriver run fall short of the goal. In the sport fishery, if the inriver run falls below 60,000 fish, then restrictions to maintain the sport harvest below 2,000 fish are required. If the inriver run is less than 50,000 fish, then closure of the sport fishery is required. Along with sport fishery management actions, the plan directs ADF&G to take actions in the commercial and subsistence fisheries; all fisheries must close when the inriver run falls below 50,000 coho salmon.

Sport harvests and effort are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Commercial and subsistence harvests are monitored by CF and are reported in the ADF&G Annual Management Report series (Elison et al. 2015). Inriver

abundance of coho salmon in the Nushagak River is estimated by side scan sonar operated near the village of Portage Creek. Sport and subsistence harvests are assumed to occur above the sonar site; therefore, estimated spawning escapement is equal to the sonar count minus sport and subsistence harvest.

From 1984 through 1992, Nushagak River coho salmon stocks were managed to achieve a biological escapement goal (BEG) of 150,000 fish, estimated by sonar at Portage Creek. However, spawning escapements during that period consistently fell short of the goal, averaging 85,020 fish. Subsequent spawner–recruit analysis suggested the 150,000 fish goal was higher than necessary to manage for maximum sustained yield. ADF&G used new spawner–recruit data to reduce the BEG to 90,000 spawners in 1992. The present bag and possession limits for coho salmon on the Nushagak–Mulchatna drainage are 5 fish per day with no size limit[5]. That is the same limit for most of the region and has been in effect since 1972.

2015 Season

Estimates of sport fishing effort, catch, and harvest will not be available until 2016; however, anglers reported good sport fishing. Due to budget shortfalls, the 2015 run was not counted by sonar and no aerial escapement surveys were flown, so total run size and escapement is unknown. The commercial harvest was 5,635 fish (Table 15). The low commercial harvest was due to limited markets and little participation.

Table 15.–Coho salmon commercial, subsistence, and sport harvest, plus inriver abundance for the Nushagak River drainage, 1995–2015, with 1980–1994 average.

Year	Harvest			Inriver abundance estimate [b]	Estimated spawning escapement
	Commercial [a]	Subsistence	Sport		
1995	4,181	3,905	725	53,510	51,519
1996	11,401	5,217	3,488	235,007	231,264
1997	4,110	3,433	500	46,243	44,552
1998	22,703	5,316	1,368	127,199	124,325
1999	2,836	3,993	618	38,697	36,714
2000	112,852	5,983	2,219	219,328	215,801
2001	3,218	5,993	2,113	86,822	83,337
2002	93	4,565	1,415	53,775	51,204
2003	583	5,432	917	NA	NA
2004	47,706	4,240	2,814	152,613	149,580
2005	42,456	5,596	1,835	NA	NA
2006	44,385	3,590	1,810	NA	NA
2007	29,578	3,050	2,399	NA	NA
2008	76,932	5,133	6,390	NA	NA

-continued-

[5] Alaska sport fishing regulations summary - Bristol Bay drainages (effective April 15, 2015 through April 14, 2016) Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.

Table 15.–Part 2 of 2.

Year	Harvest			Inriver abundance estimate [b]	Estimated spawning escapement
	Commercial [a]	Subsistence	Sport		
2009	35,171	6,777	3,222	NA	NA
2010	72,909	2,983	2,261	NA	NA
2011	4,712	5,746	2,997	NA	NA
2012	97,382	2,642	3,208	329,946	327,431
2013	124,185	7,717	2,700	200,718	196,239
2014	242,391	NA	5,319	483,219	NA
Average					
1980–1994	93,901	6,411	808	101,753	98,649
1995–2014	48,989	4,806	2,416	168,923	137,451
2010–2014	108,316	4,772	3,297	337,961	261,835
Percent					
1995–2014	87%	9%	4%		
2010–2014	93%	4%	3%		
2015	5,635	NA	NA	NA	NA

Source: Commercial and subsistence harvest: Elison et al. (2015). Sport: Alaska Sport Fishing Survey database [Intranet]. 1996–. Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Total Nushagak District commercial harvest.

[b] Inriver abundance estimated by sonar counter at Portage Creek.

TOGIAK RIVER

Fishery Description

The bulk of the Togiak River coho salmon fishery occurs in the lower 20 miles of the Togiak River (Figure 4) below the Wilderness boundary of the Togiak National Wildlife Refuge. The sport fishery occurs from early August to the middle of September. The best angling usually occurs between August 21 and September 7 when the coho salmon enter in the greatest abundance. Angler effort is largely nonresident guided anglers who access the river by flying out from nearby lodges to fish for the day. In addition, there are 2 river-based lodges that cater to nonresident anglers, one of which is owned by the local native corporation in Togiak and leased to a concession group.

Sport harvest of coho salmon from the Togiak River averaged 1,873 fish annually from 2010 through 2014, or about 9% of the total Togiak River coho salmon harvest (Table 16). Annual sport harvest peaked in 2008 at 3,420 fish. A high degree of voluntary catch-and-release angling has been documented for this fishery and ranges up to 60% of the catch (Gryska and Naughton 2000). Given previous studies (Vincent-Lang et al. 1993), concern over hook-induced mortality prompted staff to evaluate the potential catch-and-release mortality in this fishery. ADF&G concluded that although the released proportion of the catch was large, the total number of fish caught is small in terms of the total run. Therefore, catch-and-release is believed to affect only a small number of fish and is expected to have only a minor impact on the overall abundance of the stocks. In addition, Vincent-Lang et al. (1993) and Stuby (2002) have demonstrated that the mortality of released coho salmon is low when catches are made above the intertidal area, as is the case for much of the Togiak River fishery.

Based on freshwater logbook data from 2006 through 2013, guided angler-days have ranged from 873 in 2010 to 2,485 in 2006 with an average of 1,218 angler-days from 2009 through 2013 (Table 2).

Since 1995, commercial catches in the Togiak Section have been erratic, ranging from a high of 58,978 fish in 1998 to a low of 8 in 2005. The annual average commercial harvest from 2010 through 2014 was 18,240 fish, accounting for 86% of the total Togiak coho salmon harvest (Table 16).

From 2010 through 2014, subsistence harvests were relatively stable and ranged from 208 to 545 fish per year (Table 16).

Fishery Management and Objectives

Currently there is no escapement goal for Togiak River coho salmon due to a lack of annual escapement information. Coho salmon runs have been highly variable; weather frequently prohibits escapement assessment, and occasional illegal fishing with unknown harvest has confounded ADF&G's ability to consistently collect accurate run size information.

Sport fishery harvests and effort are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Commercial and subsistence harvests are monitored by CF and are reported in the ADF&G Annual Management Report series (Elison et al. 2015). SF conducted significant monitoring and stock assessment projects in 1984 and 1989 (Minard and Lisac 1984; Dunaway 1990b). A creel survey to estimate catch and harvest rates in the sport fishery was conducted in 1999 (Gryska and Naughton 2000). When weather and water conditions permit, CF estimates annual spawning escapement of Togiak River coho salmon by conducting aerial escapement index counts.

Since 1972, the bag and possession limit for coho salmon on the Togiak River has been 5 per day with no size limit[6]. For years when spawner escapements have been adequate, such as 1996, the current bag limit of 5 has been satisfactory, but in poor years ADF&G has responded with emergency order restrictions to restrict the bag limit and reduce overall harvest. Prior to 1999, the limit was restricted 4 times in response to conservation concerns. There were no inseason restrictions placed on this fishery from 2010 through 2014.

2015 season

Sport fishing effort, catch, and harvest will not be available until 2016. Anglers reported better than average sport fishing success throughout the season. No inseason restrictions were made and the sport fishery was allowed to proceed normally. Aerial surveys were not conducted in 2015 (Matt Jones, Assistant Area Management Biologist, ADF&G CF, Dillingham, personal communication).

[6] Alaska sport fishing regulations summary—Bristol Bay drainages (effective April 15, 2015 through April 14, 2016) Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.

Table 16.–Coho salmon commercial, subsistence, and sport harvest plus escapement for the Togiak River, 1995–2015, with 1977–1994 average.

	Harvest					
Year	Commercial	Subsistence	Sport	Total	Escapement [a]	Total run
1995	8,871	703	408	9,982		NA
1996	58,978	199	1,382	60,559	64,980	125,539
1997	2,970	260	780	4,010	20,625	24,635
1998	58,688	310	1,020	60,018	25,335	85,353
1999	2,653	217	1,109	3,979	3,855	NA
2000	2,758	342	840	3,940	NA	NA
2001	284	388	1,004	1,676	NA	NA
2002	754	241	1,475	2,470	NA	NA
2003	1,047	883	2,086	4,016	NA	NA
2004	15,463	204	2,321	17,988	NA	NA
2005	8	295	1,959	2,262	NA	NA
2006	449	408	2,214	3,071	NA	NA
2007	157	110	1,970	2,237	NA	NA
2008	1,159	541	3,420	5,120	NA	NA
2009	9,209	272	1,556	11,037	NA	NA
2010	24,065	514	772	25,351	NA	NA
2011	7,605	545	1,232	9,382	NA	NA
2012	15,977	293	2,506	18,776	NA	NA
2013	11,420	208	1,534	13,162	NA	NA
2014	32,131	366	3,319	35,816	NA	NA
Average						
1977–1994	37,484	1,233	543	39,260	42,045	83,752
1995–2014	12,732	365	1,645	14,743	28,699	78,509
2010–2014	18,240	385	1,873	20,497	NA	NA
Percent						
1995–2014	86%	2%	11%			
2010–2014	89%	2%	9%			
2015	21,999	NA	NA	NA	NA	NA

Source: Commercial and subsistence harvest and escapement: Elison et al. (2015). Sport: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Escapement estimates are based on fixed wing aerial surveys. Peak counts are expanded by a factor of 3 to account for missed fish. In 1985–1987, expansion factors were greater due to incomplete surveys or poor survey conditions.

SOCKEYE SALMON FISHERIES

Sockeye salmon is the most numerous of the Pacific salmon species to spawn in Bristol Bay, which is the world's largest producer of sockeye salmon. Their prized eating qualities make sockeye salmon the most popular species of salmon on the commercial market. Sockeye salmon are often indifferent to most fishing lures, making them difficult to catch. Since the late 1960s however, anglers have discovered innovative ways to legally catch sockeye salmon with customary sport gear, and the species has rapidly gained favor as a hard-fighting and delectable game fish. The most popular fisheries exist in the Naknek and Kvichak river drainages, but effort is growing in other waters of the BBMA as well (Figure 5).

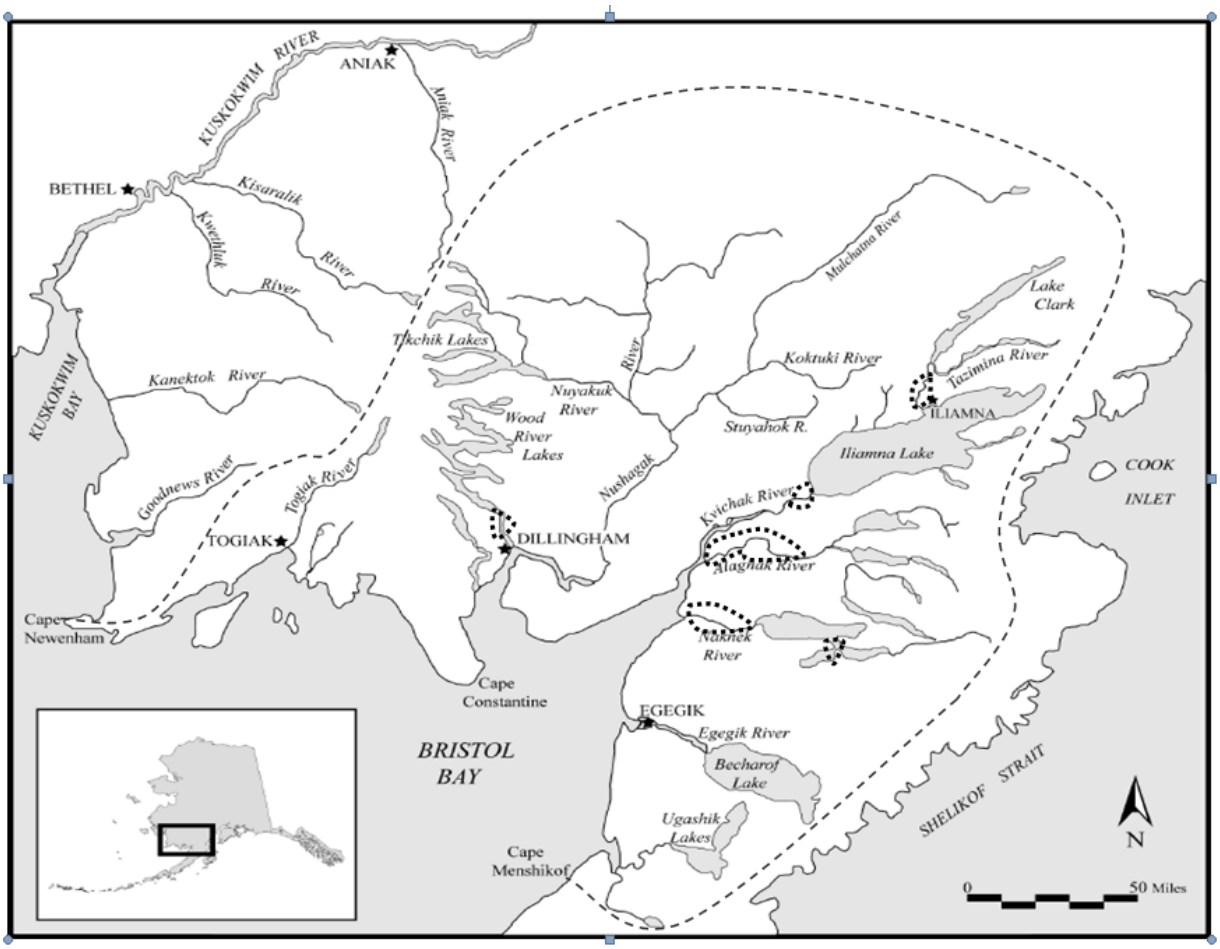

Figure 5.–Popular sockeye salmon sport fisheries (delineated with dark square dots) in the Bristol Bay Management Area.

Harvest of sockeye salmon in the BBMA has averaged 14,845 from 2009 through 2013 (Table 17) with a peak estimate of nearly 17,874 fish taken in 2009 and a low of 13,218 fish in 2013. The most active sport fisheries occur in the Eastern section of the management area, where an average (2009–2013) of 12,358 fish or about 85% of the annual harvest was taken. The Central section fishery harvest has averaged 2,258 sockeye per year and harvest in the Western section has averaged just over 200 fish annually (Table 17). Even at its highest levels, the sport harvest is approximately 0.05% of the 2004 through 2013 average annual run of 37.6 million sockeye salmon (Elison et al. 2015). Subsistence fishermen have harvested approximately 0.3% of the annual sockeye salmon run from 2004 through 2013 (Elison et al. 2015).

Sockeye salmon share the same bag and possession limit with all salmon except Chinook salmon: 5 salmon per day with no size limit. This regionwide limit has been in effect since 1972. ADF&G's ability to manage for sustained yield is essentially unaffected by the recreational harvest of sockeye salmon. No adjustments were made to the bag and possession limits through the 2015 season. Sockeye salmon continue to play an important role in the development and expansion of the recreational fishery in the BBMA.

Table 17.–Sport harvest of sockeye salmon by section for the BBMA, 2004–2014, with 1977–2003 average.

Section	Drainage	Average 1977–2003	Annual sport fishing harvest of sockeye salmon										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Eastern														
	Naknek R.	882	1,525	1,098	4,670	4,346	6,008	4,404	4,025	3,486	3,324	5,924	4,233	4,586
	Brooks R.	429	996	133	415	61	353	238	311	263	584	23	284	411
	Kvichak R.	1,633	2,210	2,431	927	873	2,777	2,711	2,628	2,100	1,689	1,244	2,074	2,427
	Copper R.	380	73	97	158	225	195	201	229	258	517	123	266	657
	Alagnak R.	711	2,121	3,340	3,346	2,101	2,849	2,070	1,553	2,082	2,770	611	1,817	1,032
	Newhalen R.	4,019	2,741	1,528	2,085	1,886	1,039	2,662	753	920	772	2,182	1,458	559
	Lake Clark	312	147	236	122	0	225	69	51	203	243	630	239	181
	Other	1,878	813	166	1,778	1,837	2,690	2,034	1,861	2,811	2,028	1,204	1,988	1,188
	Subtotal [a]	10,243	10,626	9,029	13,501	11,329	16,136	14,389	11,411	12,123	11,927	11,941	12,358	11,041
Central														
	Nushagak R.	460	252	721	442	342	568	408	1,196	355	344	403	541	209
	Mulchatna R.	300	67	355	134	580	65	107	30	302	164	445	210	446
	Agulowak R.	251	22	618	689	171	250	234	1,498	166	702	91	538	317
	Agulukpak R.	100	169	0	412	125	65	1,282	0	0	169	14	293	0
	Wood River L. [b]	672	427	575	2,243	1,769	1,210	1,122	481	834	236	80	551	2,356
	Tikchik L.–Nuyakuk R.	84	0	0	0	0	195	179	50	0	120	14	73	0
	Other	189	23	0	0	0	0	0	0	143	11	111	53	94
	Subtotal [a]	2,057	960	2,269	3,920	2,987	2,353	3,332	3,255	1,800	1,746	1,158	2,258	3,422
Western														
	Togiak R.	157	485	627	237	519	104	153	59	145	668	119	229	284
	Other	3	0	0	0	0	0	0	0	0	0	0	0	0
	Subtotal [a]	161	485	627	237	519	104	153	59	145	668	119	229	284
Total		12,460	12,071	11,925	17,658	14,835	18,593	17,874	14,725	14,068	14,341	13,218	14,845	14,747

Source: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Subtotals of averages may not be the sum of the drainages because information for some drainages is not available for some years.

[b] Wood River Lakes includes Lake Nunavaugaluk. Prior to 1998, Agulowak and Agulukpak rivers were included in Wood River Lakes.

BROOKS RIVER

Fishery Description

The Brooks River, which drains Brooks Lake into Naknek Lake (Figure 5), is a 2-mile long stretch of water located within the boundaries of Katmai National Park and Preserve. This river is cherished by some anglers because of its classic pool-and-riffle structure and excellent fishing opportunities. Brooks Camp, located on Naknek Lake, was established in 1960 by Northern Consolidated Airlines as primarily a sport fishing facility, but in recent years it has also become popular with tourists for hiking and bear viewing opportunities. Access to Brooks River and Brooks Camp is by float-equipped aircraft or boat. Beside guest cabins, a campground facility is available for overnight visitors. At the lower end of Brooks River is a footbridge that allows visitors to cross between the south and north shores without wading. The sport fishery for sockeye salmon generally takes place below the bridge in the lower quarter mile of the river where it empties into Naknek Lake. The sockeye salmon fishery begins in late June when the first salmon arrive and peaks over the Fourth of July weekend. The recreational fishery occupies waters also used by brown bears fishing for salmon. This overlap has caused management problems and conflicts for ADF&G and the National Park Service. At issue is the safety of visitors and the priority in access that different groups (bear viewers, sport fishermen, hikers) should have.

Since 2004, annual estimates of sport harvests of Brooks River sockeye salmon have ranged from a low of 23 in 2013 to a high of 996 in 2004 (Table 17). The recent 5-year (2009–2013) average annual harvest of 284 fish is easily sustained by this run, which is part of the Naknek escapement of about 1 million fish (Table 17).

Based on freshwater logbook data from 2009 through 2013, guided effort has been slowly increasing with an average of 936 angler-days (Table 2).

Fishery Management and Objectives

The abundance of sockeye salmon at Brooks River is a function of the escapement into the Naknek River. The Naknek River drainage escapement goal is 800,000 to 1.4 million sockeye salmon (Elison et al. 2015). The magnitude of the escapement is such that variations in inriver abundance have little effect on sport fishery performance in the Brooks River.

Sport fishery harvests and effort are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001 a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Commercial and subsistence harvests are monitored by CF and are reported in the ADF&G Annual Management Report series (Elison et al. 2015). SF has not conducted any significant monitoring or stock assessment projects for this fishery in recent seasons. Forecasts of next season's run are provided by CF and are reported in a statewide salmon forecast summary (Geiger and Hart 1999). Escapement of sockeye salmon in the Brooks River is estimated from fixed-wing aerial surveys during the presumed peak of spawning. There has been a complicated history of regulations regarding this sport fishery. The current regulations are the result of a total revamping of the regulations in 1990 as part of the development of a rainbow trout management plan for the area. The regulation allowing catch-and-release fishing only for all species for the Brooks River from Brooks Lake downstream to the foot bridge was adopted during the fall of 1997 in an effort to address bear–human concerns raised by the

National Park Service. From the bridge downstream to Naknek Lake, anglers may keep 1 fish per day and in possession except rainbow trout, which are managed for catch-and-release fishing for the entire river[7]. Anglers are restricted to single-hook artificial lures below the footbridge and unbaited single-hook artificial flies above the bridge. Over the years, significant concessions of sport fishing opportunity have been made under the premise of ensuring the safety of sport anglers using the Brooks River. These concessions include reductions in bag limits from 5 sockeye salmon to 1, restrictions in terminal tackle to include single-hook artificial lures below the bridge, and the previously mentioned catch-and-release only, fly-fishing-only above the bridge.

The Brooks River is managed to provide a diversity of angling opportunity by providing a special management area restricted to unbaited, single-hook, artificial flies.

2015 season

In 2015, escapement of sockeye salmon into the Naknek River drainage totaled 1,920,954, exceeding the goal of 800,000 to 1.4 million fish (Brookover et al. *In prep*). The large sockeye salmon escapement into the Naknek River system provided plenty of fish for anglers in the Brooks River and for anglers throughout the Naknek River drainage. No inseason restrictions were imposed on the sport fishery.

KVICHAK RIVER

Fishery Description

The Kvichak River drainage (Figure 5) hosts the single largest sockeye salmon run in the world and the river itself is a popular destination for anglers targeting this species. Two locations within the drainage support the biggest sport fisheries for sockeye salmon in Bristol Bay. The first location is the fishery on the Kvichak River at the outlet of Lake Iliamna. The other, often larger, fishery occurs on the Newhalen River near the community of Iliamna. Smaller tributaries within the drainage are fished much less intensively and sport harvests there are relatively minor in comparison to the 2 large fisheries.

Sockeye salmon first appear in the Kvichak River during the last week of June. The run peaks in the first week of July, then declines steadily until late July or early August. In peak years, the sport fishery may be active for much of the month of July.

A modern airstrip and trail system in the village of Igiugig provides easy access to the river where it drains out of Lake Iliamna and floatplanes can land on the lake or on the river. Although much of the sport fishing effort is from nonresident guided anglers, a growing component is the resident unguided angler arriving from Anchorage in private, chartered, or scheduled aircraft. The Igiugig Native Corporation owns most of the uplands along the upper Kvichak River, and charges anglers modest daily fees for access. Commercial operators are charged more substantial fees for annual leases.

Historically, the Bristol Bay commercial salmon fleet harvests roughly half of the annual Kvichak River sockeye salmon run and until 1995, the subsistence fishery took an average of

[7] Alaska sport fishing regulations summary—Bristol Bay drainages (effective April 15, 2015 through April 14, 2016) Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.

nearly 78,000 fish annually, or about 1% of the total run (Table 18). Since 2010, the annual subsistence harvest has averaged 45,272.

Since 1995, estimates of the sport harvest of sockeye salmon from the Kvichak River drainage ranged from 1,244 sockeye salmon in 2013 to 15,023 in 1995 (Table 18). From 2009 through 2013, the annual sport harvest averaged 2,074 sockeye salmon from the Kvichak River alone (Table 17). On average, sport harvest accounts for less than 0.1% of the total harvest. From 2009 through 2013, total effort was about 5,503 angler-days (effort is for all species, although anglers mainly fish for rainbow trout and sockeye salmon at the Kvichak River; Table 1). At such low levels, the sport fishery has little effect on ADF&G's ability to manage for sustained yield.

Based on freshwater logbook data from 2009 through 2013, guided effort averaged 1,518 angler-days (Table 2).

Fishery Management and Objectives

Kvichak River sockeye salmon stocks are managed to achieve a sustainable escapement goal (SEG) range of 2 million to 10 million fish (Elison et al. 2015).

The sport fishery is managed in accordance with *Kvichak Drainage Sockeye Salmon Management Plan* (5 AAC 67.025). The goal of the plan is to provide increased participation and opportunity and to reduce the potential for conflicts between sport and subsistence users. The level of participation in this fishery could grow quickly by improving access to desirable fishing sites, promoting the fishery as a destination, and working to assure necessary facilities are provided to accommodate the growth in a responsible manner. To this end, ADF&G has worked closely with the Igiugig City Council on a project to build trails to desirable fishing locations close to the village airfield. For example, a trail was completed from the village road system to a prime sockeye salmon fishing site along the Kvichak River in fall 2001.

Sport fishery harvests and effort are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001 a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Commercial and subsistence harvests are monitored by CF and are reported in the ADF&G Annual Management Report series (Elison et al. 2015).

2015 season

The 2015 sockeye salmon run to the Kvichak River achieved the minimum SEG of 2.0 million fish. Approximately 7.3 million sockeye salmon were counted at the Igiugig tower.

Although no estimate is available at this time, we expect the subsistence harvest to be within the normal historical range of 40,000 to 60,000 sockeye salmon.

Due to a large forecast and no inseason emergency orders restricting the sport fishery, the number of anglers targeting sockeye salmon in the Iliamna drainage during 2015 was likely near or above the recent 20-year average and it is therefore anticipated that the sport fishery harvest will be similar to or greater than the recent 20-year average. Estimates of recreational effort, catch, and harvest will not be available until 2016.

Table 18.–Historical sockeye salmon harvests and escapements for the Kvichak River, 1995–2015, with 1974–1994 average.

	Harvest				
Year	Commercial [a]	Subsistence [b]	Sport [c]	Total	Escapement [d]
1995	20,279,581	54,679	15,023	20,349,283	10,038,720
1996	8,215,028	54,872	6,078	8,275,978	1,450,578
1997	589,311	59,508	7,875	656,694	1,503,732
1998	2,595,439	53,656	13,119	2,662,214	2,296,074
1999	9,452,972	57,723	12,760	9,523,455	6,196,914
2000	4,727,061	36,990	8,479	4,772,530	1,827,780
2001	5,280,538	32,808	4,538	5,317,884	1,095,348
2002	1,418,938	33,001	2,256	1,454,195	703,884
2003	3,348,504	38,495	3,068	3,390,067	1,687,000
2004	4,715,070	53,225	5,098	4,773,393	5,500,134
2005	6,728,469	48,263	4,292	6,781,024	2,320,332
2006	7,151,741	49,850	4,398	7,205,989	3,068,422
2007	9,022,511	47,473	3,697	9,073,681	3,068,226
2008	10,381,844	49,563	9,274	10,440,681	2,810,208
2009	8,514,944	46,772	2,711	8,564,427	2,757,912
2010	10,858,209	40,688	2,628	10,901,525	2,266,140
2011	9,016,321	45,226	2,100	9,063,647	4,207,410
2012	10,152,917	52,370	1,689	10,206,976	2,264,352
2013	4,853,030	42,556	1,244	4,896,830	4,164,444
2014	13,791,057	45,522	2,427	13,839,006	2,088,576
Average					
1974–1994	9,111,460	78,014	7,384	6,573,107	6,230,000
1995–2014	7,554,674	47,162	5,638	7,607,474	3,065,809
2010–2014	9,734,307	45,272	2,018	9,781,597	2,998,184
Percent					
1995–2014	99%	<1%	<1%		
2010–2014	100%	<1%	<1%		
2015	16,304,723	NA	NA	NA	4,458,540

Source: Commercial: 1995–2014 Elison et al (2015: Appendix A3), 1974–1994 Browning and Miller (1995: Appendix 5). Subsistence: 1995–2014 Elison et al (2015: Appendix A28), 1974-1994 Browning and Miller (1995: Appendix 40). Sport: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services). Escapement: 1995–2014 Elison et al (2015: Appendix A1), 1974–1994 Browning and Miller (1995: Appendix Table 1).

[a] Estimated Kvichak River fish captured in Naknek–Kvichak District commercial fishery.

[b] Harvests are extrapolated for all permits issued, based on those returned. Harvest estimates prior to 1991 are rounded to the nearest hundred fish. Harvest estimates prior to 1990 are based on the community where the permit was issued; estimates from 1990 to the present are based on community of residence and include fish caught only in the Kvichak District.

[c] Kvichak River sport harvest only.

[d] Tower counts conducted at Igiugig.

NEWHALEN RIVER

Fishery Description

The Newhalen River is the major tributary in the Kvichak River drainage. It flows from Lake Clark into the north side of Lake Iliamna near the communities of Iliamna and Newhalen (Figure 5). Because it is farther inland, sockeye salmon reach the Newhalen River a few days later than the Kvichak River, and the best angling usually occurs during the middle 2 weeks of July.

The Newhalen River is more easily accessed than the Kvichak River and supports a large run of sockeye salmon. Several businesses and lodges in the town of Iliamna cater to anglers' needs, and a large runway serviced by regularly scheduled commercial airlines provides economical access from Anchorage. From the runway, a mile-long trail leads to the river. The trail ends near a series of cascades where large numbers of sockeye salmon congregate on their way to spawning grounds in the Lake Clark drainage. The sockeye salmon entering the Newhalen River are one segment of the large Kvichak River run. Hence, comments on the character of the commercial and subsistence harvests for the Kvichak River apply equally for the Newhalen River stocks. The sport fishery on the Newhalen River is unique in the BBMA due to the large component of unguided anglers and for its history of regularly producing 25% to over 40% of the entire BBMA's annual sport harvest of sockeye salmon (Tables 17). For the period 2009 through 2013, the annual sport harvest averaged 1,458 sockeye salmon (Table 17). ADF&G has not conducted any onsite studies of this fishery to evaluate angler catch and harvest distribution, angler demographics, or to conduct bag limit analysis.

Based on freshwater logbook data from 2009 through 2013, guided effort has remained fairly stable with an average of 146 angler-days (Table 2).

Fishery Management and Objectives

Newhalen River sockeye salmon escapement is addressed by achieving the biological escapement goal (BEG) for the Kvichak River.

Sport fishery harvests and effort are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Commercial and subsistence harvests are monitored by CF and are reported in the ADF&G Annual Management Report series (Elison et al. 2015). SF has not conducted any significant monitoring or stock assessment projects for this fishery. Escapement is estimated by counts made from towers at the village of Igiugig as the salmon migrate up the Kvichak River. Escapement distribution is assessed by aerial index surveys of drainage tributaries by Division of Commercial Fisheries.

2015 season

The preceding segment on the Kvichak River sockeye salmon sport fishery thoroughly describes the 2015 season run. Sport fishing was reported as average to above-average throughout the season.

CENTRAL SECTION SOCKEYE SALMON FISHERIES

About 15% of Bristol Bay sockeye salmon return to the Central section. Anglers do not fish this section heavily for sockeye salmon, and sport harvests average 2,300 fish, or 15% of the area's

total annual sport harvest (Table 17). Angler harvest of sockeye salmon from the Central Section in 2014 totaled 3,422 fish, and was the highest reported since 2006[8]. The stocks are generally abundant enough to be virtually unaffected by the recreational harvest, and there is a lot of potential for this fishery to grow. The subsistence and sport harvests are each less than 1% of the run. The waters most commonly used by sport anglers are the Nushagak River, Mulchatna River, and the Wood River Lakes system.

RAINBOW TROUT FISHERIES

AREAWIDE FISHERY DESCRIPTION

Wild rainbow trout stocks are a cornerstone to the multimillion-dollar recreational fishing industry of the BBMA. Sport fishing opportunity for both guided and unguided anglers occurs primarily during the ice-free season, generally from June through October, although fisheries in early and late winter are gaining some popularity. Found throughout the area, the most popular rainbow trout waters include tributaries of the Kvichak River drainage, the Naknek River drainage, portions of the Nushagak–Mulchatna drainage, and streams of the Wood River Lakes system (Figure 6).

The rainbow trout fisheries within the BBMA underwent rapid growth from the late 1970s to mid-1980s, with annual harvests averaging 4,905 fish from 1977 through 2003 (Table 19). From 2009 through 2013, annual harvests averaged 833 fish (Table 19). The importance of this species to the recreational fisheries is not adequately described by estimates of harvest. Results of the SWHS, as well as field studies, show clearly that during the last 20 to 25 years the retention rate, or the number of fish kept from total catch, has declined steadily while the total effort and catch have remained stable or increased (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*; Minard 1989b, 1990; Brookover 1989; Dunaway 1993). Estimates of catch (number of fish kept plus fish released) were first available from the SWHS in 1991 and have averaged 247,060 annually through 2003. From 2009 through 2013, the annual catch averaged 169,485 rainbow trout (Appendix A4, Figure 7). It is evident the angling public has embraced the concept of catch-and-release for rainbow trout and has voluntarily reduced their harvests throughout the area.

Prior to 1993, rainbow trout were explicitly excluded from harvest under the subsistence priority. The status of rainbow trout as a subsistence species was changed in 1993 when the BOF allowed rainbow trout caught incidentally to other species to be retained by subsistence users. In 1994, the BOF recognized subsistence use of rainbow trout among all other finfish in Bristol Bay (5 AAC 01.336). The subsistence taking of rainbow trout from non-navigable waters located within federal land holdings (National Wildlife Refuges and National Parks) has been allowed since December 1991. In 2002, the Federal Subsistence Board adopted regulations allowing rod and reel subsistence harvest of rainbow trout in federally managed subsistence fisheries in the Bristol Bay area.

Many quality rainbow trout sport fisheries exist throughout the BBMA. Other smaller rainbow trout fisheries not discussed below include Brooks River, Moraine, and Funnel creeks, American

[8] Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish [cited October 14, 2015]

Creek, Gibraltar River, Copper River, Upper Talarik Creek, Tazimina River, Mulchatna River and Togiak River.

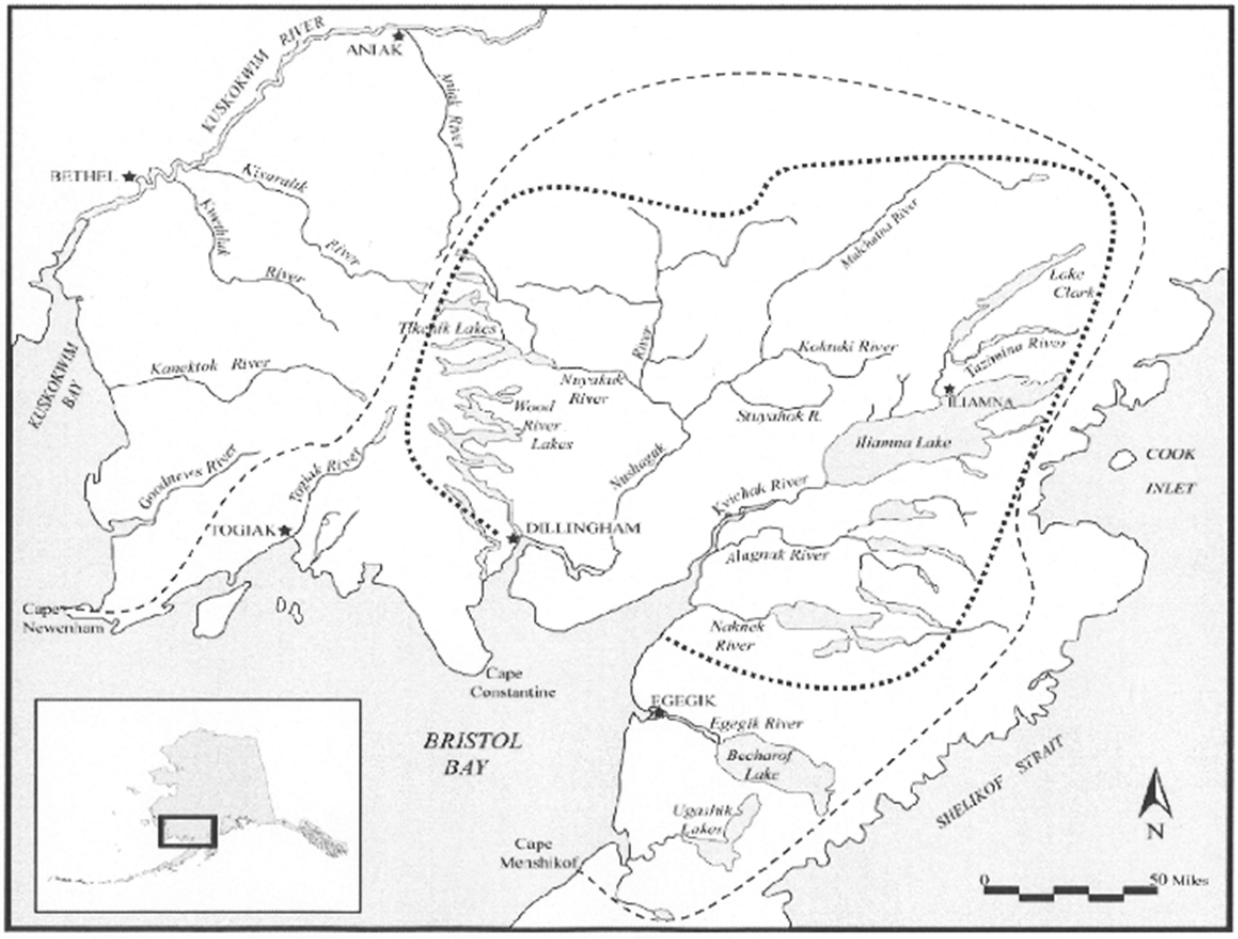

Figure 6.–Popular rainbow trout sport fisheries (delineated with black dots) in the Bristol Bay Sport Fish Management Area.

Table 19.–Sport harvest of rainbow trout by section and drainage in the BBMA, 2004–2014, with 1977–2003 average.

Section	Drainage	Average 1977–2003	Annual sport fishing harvest of rainbow trout										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Eastern														
	Naknek R.	1,012	272	175	196	307	175	60	226	589	48	47	194	78
	Brooks R.	74	0	358	22	152	0	0	0	0	0	22	4	0
	Kvichak R.	269	193	221	0	457	136	38	60	20	0	0	24	102
	Copper R.	69	14	0	0	0	0	0	0	0	133	0	27	320
	Alagnak R.	220	163	413	47	20	66	0	0	20	0	124	29	64
	Newhalen R.	248	89	77	72	10	272	0	87	0	21	35	29	0
	Lake Clark	19	27	0	0	0	0	0	0	0	0	24	5	0
	Other	1,375	212	31	191	677	430	187	57	971	0	13	246	32
	Subtotal [a]	3,286	970	1,275	528	1,623	1,079	285	430	1,600	202	265	556	596
Central														
	Nushagak R.	228	164	74	39	243	32	105	99	98	17	0	64	0
	Mulchatna R.	371	37	36	298	262	25	23	186	96	309	0	123	0
	Agulowak R.	4	397	22	72	76	77	9	0	67	17	58	30	52
	Agulukpak R.	2	0	21	0	0	0	0	0	0	0	0	0	0
	Wood River L. [b]	378	156	55	104	169	31	17	34	33	50	0	27	0
	Tikchik L.–Nuyakuk R.	72	0	0	0	0	0	10	0	0	0	0	2	0
	Other	479	117	132	67	0	0	0	17	20	0	0	7	0
	Subtotal [a]	1,534	871	340	580	750	165	164	336	314	393	58	253	52
Western														
	Togiak R.	77	102	287	0	152	11	13	0	47	57	0	23	0
	Other	9	0	0	0	0	0	0	0	0	0	0	0	0
	Subtotal [a]	86	102	287	0	152	11	13	0	47	57	0	23	0
Total		4,905	1,943	1,902	1,108	2,525	1,255	462	766	1,961	652	323	833	648

Source: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Subtotals of averages may not be the sum of the drainages because information for some drainages is not available for some years.

[b] Wood River Lakes includes Lake Nunavaugaluk. Prior to 1998, Agulowak and Agulukpak rivers were included in Wood River Lakes.

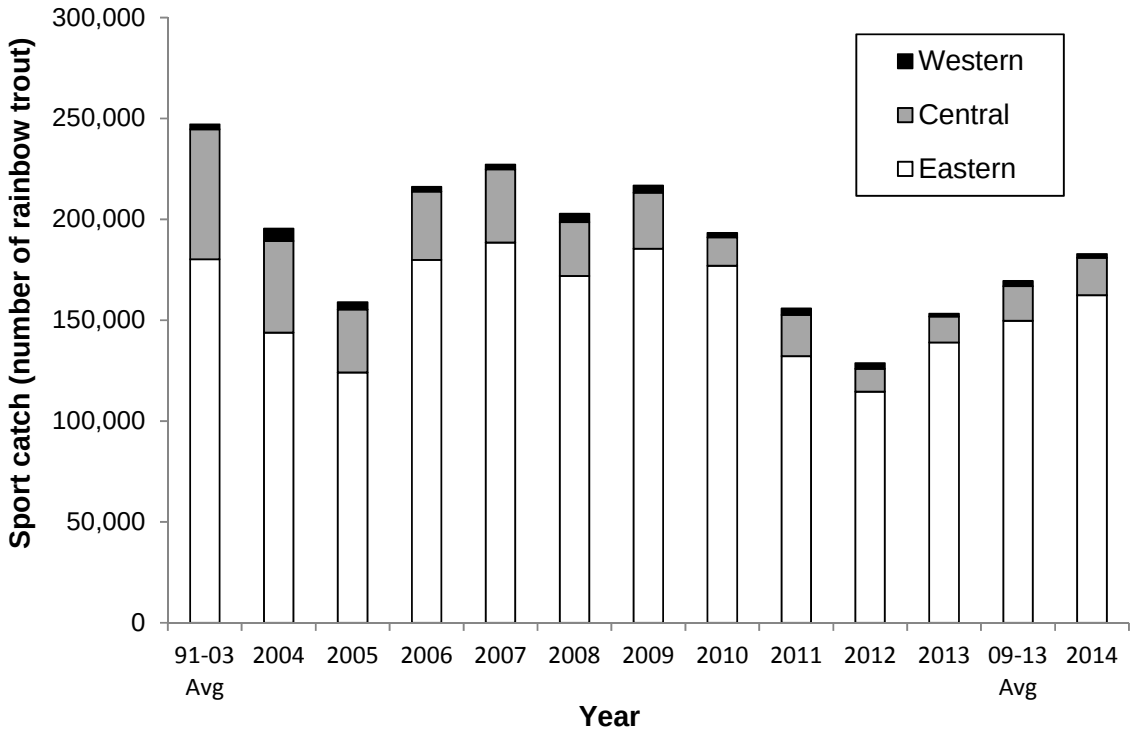

Figure 7.–Sport catch of rainbow trout by section for the Bristol Bay Sport Fish Management Area, 2004–2014, with averages for 1991–2003 and 2009–2013.

SOUTHWEST ALASKA RAINBOW TROUT MANAGEMENT PLAN

In February 1990, the BOF adopted regulations implementing a comprehensive management plan for rainbow trout in the area previously known as the Southwest Alaska Management Area. This area included the BBMA, the waters flowing into Kuskokwim Bay from Cape Newenham to the outlet of the Kuskokwim River, and the Kuskokwim River and tributaries from the Aniak River to Kuskokwim Bay[9]. Still in force, this plan is not a regulation but is used as a policy for guiding the BOF and the public. It provides a clear understanding of the underlying principles by which rainbow trout stocks are to be managed and provides guidance for the BOF in developing future regulations. In 1998, the BOF adopted *Criteria for Establishing Special Management Areas for Trout* (5 AAC 75.013). This regulation embodies most of the criteria that originated, and are still used, in the Southwest Alaska Rainbow Trout Management Plan.

Philosophy of the Plan

The overriding philosophy of the *Southwest Alaska Rainbow Trout Management Plan* is one of conservative wild stock management. Conservative wild stock management does not necessarily preclude limited harvest of rainbow trout for food or trophies. However, maximum yield principles that emphasize harvest are ruled out. Additionally, under a philosophy that emphasizes wild trout management, mitigating losses of wild stocks through enhancement or stocking is not considered a desirable management alternative.

[9] ADF&G. 1990. Southwest Alaska rainbow trout management plan. Located at: Alaska Department of Fish and Game, Division of Sport Fish, 333 Raspberry Road, Anchorage.

Conservative wild stock management is guided by both biological considerations and social concerns. Growth in the region's rainbow trout sport fisheries is inevitable, but by managing the area's wild rainbow trout stocks conservatively, the potential for serious long-term resource problems is minimized. From a social perspective, conservative wild stock management is consistent with the priorities of most of the public presently using the resource. The *Southwest Alaska Rainbow Trout Management Plan* contains 3 policies that are intended to protect the biological integrity of the region's wild trout stocks and maximize their recreational benefit and economic potential. The policies guide the development of sport fishing regulations and provide ADF&G management biologists, BOF members, and the public with clear direction as to how rainbow trout fisheries in the BBMA should be managed. The 3 policies are as follows:

1) Native rainbow trout populations will be managed to maintain historic size and age compositions and at stock levels sufficient such that stocking is not needed to enhance or supplement the wild population.

2) A diversity of sport fishing opportunities for wild rainbow trout should be provided through establishment of special management areas by regulation. Selection of areas for special management will be based on criteria to be adopted by the BOF.

3) Management strategies should be consistent with the prudent economic development of the state's recreational sport fishing industry while at the same time acknowledging the intrinsic value of this fishery resource to the people of Alaska.

Plan Implementation

Regulations based on the *Southwest Alaska Rainbow Trout Management Plan* were adopted by the BOF in February 1990. These regulations were designed to implement the 3 management policies contained in the rainbow trout management plan. Specifically, BOF did as follows:

1) Expanded the Wild Trout Zone from the Iliamna drainage to include the drainages of Bristol Bay and Kuskokwim Bay and the Kuskokwim River from Aniak River downstream.

2) Established 8 catch-and-release areas in the BBMA and 3 catch-and-release areas in the Lower Kuskokwim Management Area (Figure 8).

3) Established 6 artificial fly-only, catch-and-release-only areas (Figure 9).

4) Established 11 unbaited single-hook artificial lure only areas to protect rainbow trout stocks (Figure 10).

Adoption of regulations implementing the management policies contained in this plan was not expected to be a one-time effort. Rather, policy implementation was understood to be a long-term process, with the policies used as the framework to develop a very important and unique resource. Special management regulations have since been adopted using this process for the Kvichak River in Bristol Bay, and the Kanektok, Kwethluk, Kasigluk, and Kisaralik rivers in the Kuskokwim area during the BOF meetings held in the fall and winter of 1997. This plan has also proved to be a useful guide for rainbow trout management in other parts of the state.

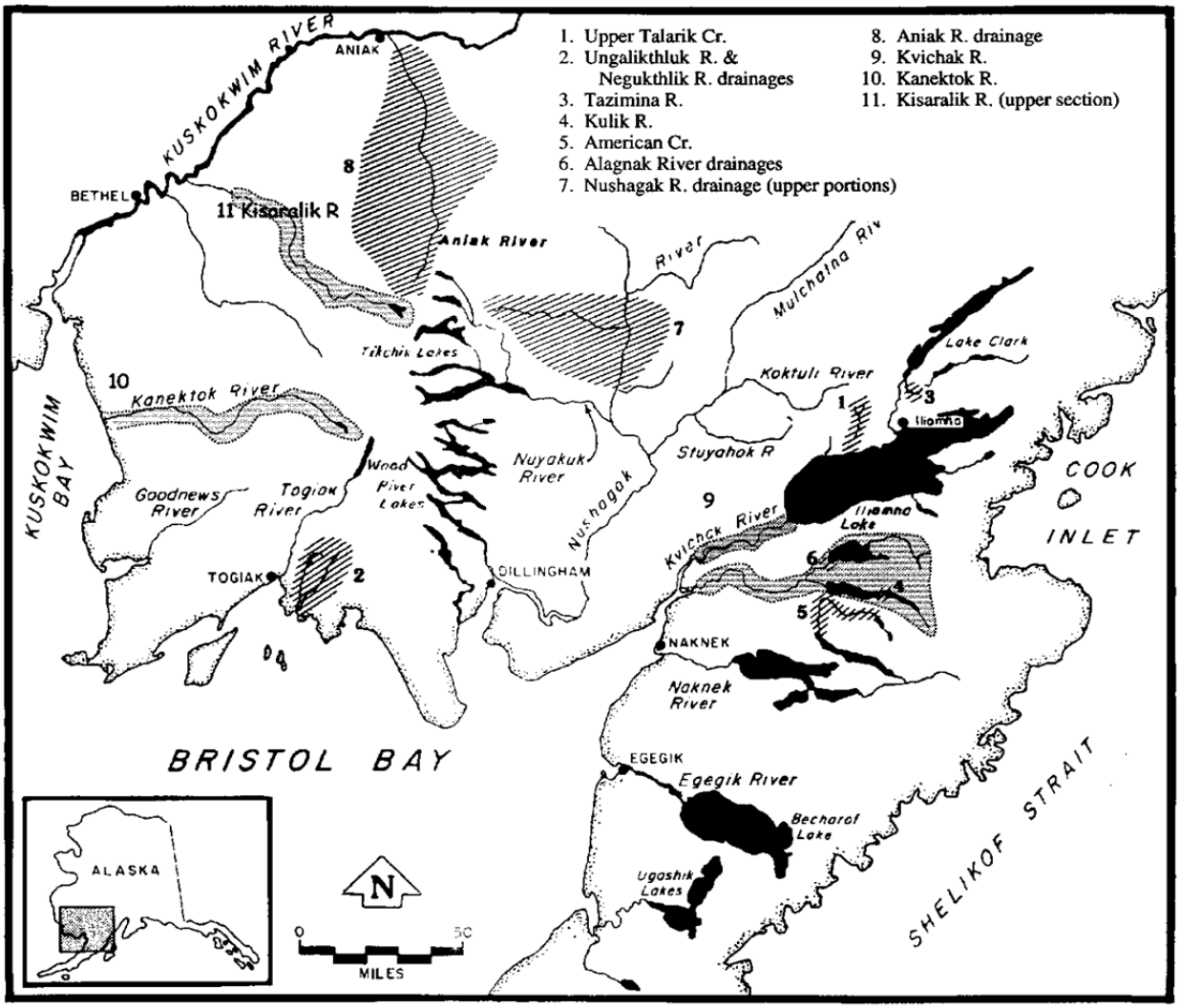

Figure 8.–Catch-and-release special management areas for rainbow trout in the Bristol Bay Sport Fish Management area.

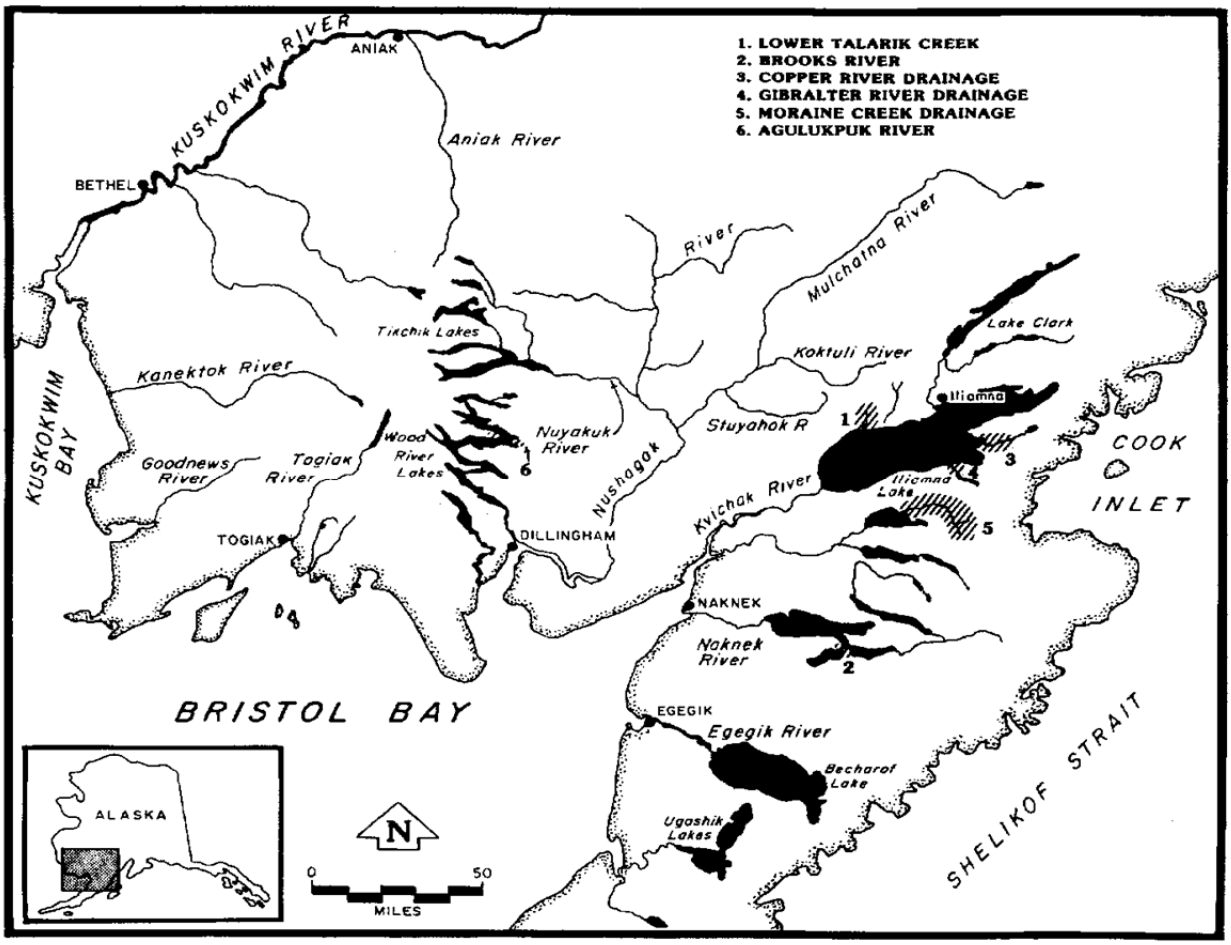

Figure 9.–Fly-only, catch-and-release special management areas for rainbow trout in the Bristol Bay Sport Fish Management Area.

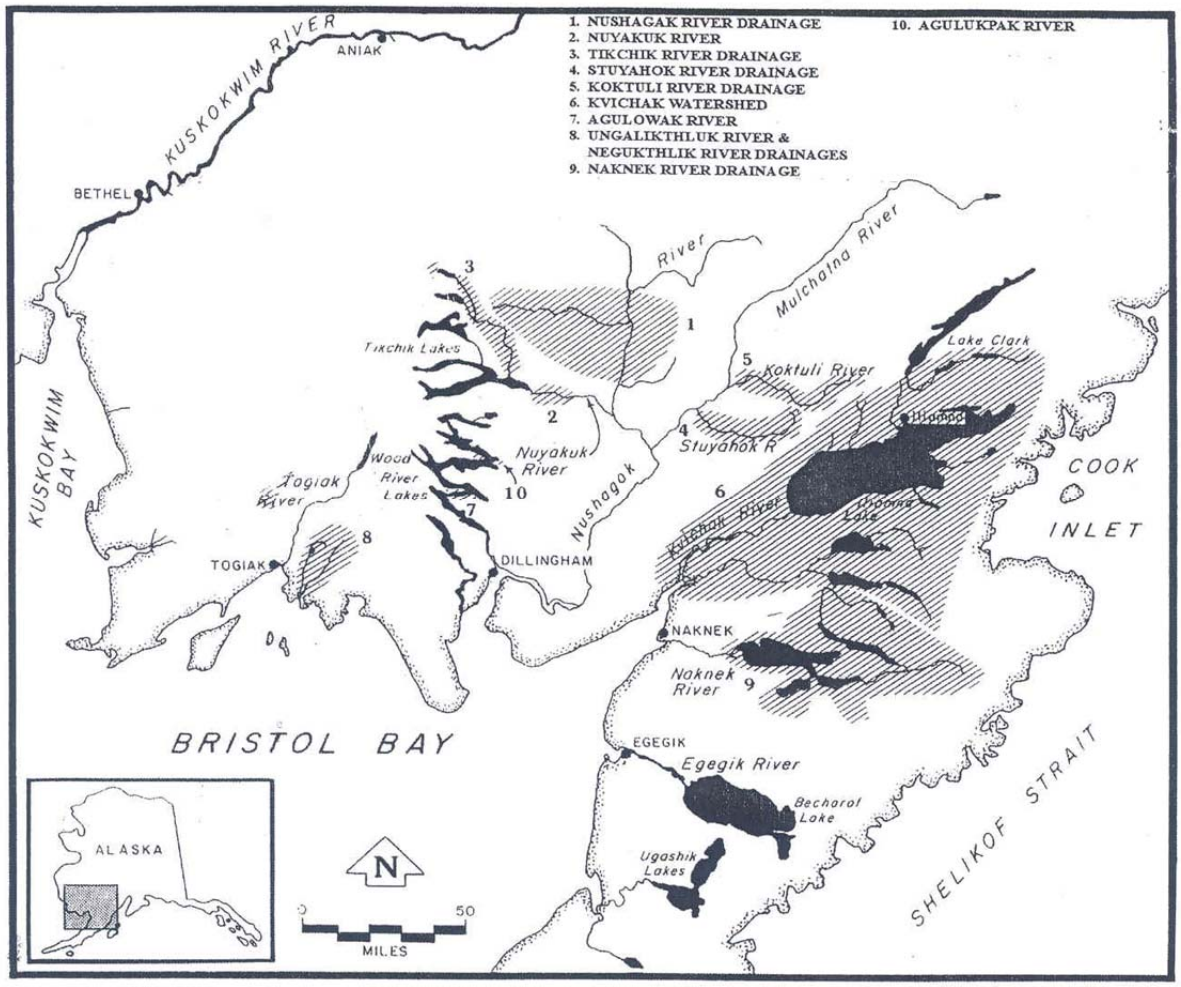

Figure 10.–Unbaited single-hook artificial lure special management areas for rainbow trout in the Bristol Bay Sport Fish Management Area.

LOWER TALARIK CREEK

Fishery Description

Lower Talarik Creek, located at the northwest corner of Lake Iliamna, is renowned for its high quality rainbow trout sport fishery. The creek is relatively small and most anglers only fish along the first 2 miles above its entrance into Lake Iliamna. The large fish, for which Lower Talarik Creek is so famous, enter the creek from Iliamna Lake to feed on salmon eggs and carcasses in the fall. The sport fishery takes advantage of this migration and is most active from mid-August until late September or October. Most anglers fishing Lower Talarik Creek are guided nonresidents who make daily fly-in trips from the many lodges operating in the Lake Iliamna area (Table 2). As many as 30 anglers can be accommodated at any given time in the lower portion of the creek that is commonly fished.

In 1992, a Native land claim had the potential to eliminate public access to this world-class rainbow trout fishery. Through an agreement with the claimant, the Nature Conservancy (TNC) obtained the land and coordinated a land management agreement with ADF&G and the Alaska Department of Natural Resources (DNR). One stipulation of the agreement was to create a Special Use Area along the lower reaches of Lower Talarik Creek that would allow public access. After extensive discussions with local leaders, the Special Use Area was created in August 1999. In the spring of 2001, TNC initiated a process to convey these lands to the state for management. The DNR-Realty Section has finalized the transfer.

Fisheries managers first estimated angler effort and harvest on Lower Talarik Creek rainbow trout with onsite creel surveys from 1970 through 1976. Annual harvest ranged from a high of 433 fish in 1971 to 73 fish in 1974. Since 1977, effort has been estimated from the SWHS and has been measured in angler-days (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Onsite creel surveys conducted during the fall fisheries of 1989, 1990, 1991, and 1993 through 2001 found effort has been at the upper range of, but not significantly different from, the levels observed in the 1970s. Note the small estimates of catch and effort in 1997 and 2001 are due to the short duration of those surveys.

Based on freshwater logbook data from 2009 through 2013, guided effort has remained fairly stable with an average of 124 angler-days (Table 2).

Fishery Management and Objectives

The Lower Talarik Creek rainbow trout fishery is managed to maintain historical age and size composition and a diversity of angling opportunity by maintaining the special management designation with artificial fly-only, catch-and-release.

Lower Talarik Creek was designated a special management area in 1990 as part of the implementation of the *Southwest Alaska Rainbow Trout Management Plan*. Sport fishing is restricted to unbaited artificial flies, and the area is catch-and-release only for rainbow trout. A season closure from April 10 through June 7 provides protection for spawning rainbow trout during this critical life stage.

Sport fishery harvests and effort are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007,

2009a, 2009b, 2015; Romberg et al. *In prep*). Subsistence harvest data are collected by CF onsite surveys that yield detailed estimates of angler use and success. Biological information and demographic information are also collected. Significant stock assessment and creel survey results are reported by Russell (1977), Minard (1990), Minard et al. (1992).

Lower Talarik Creek's small size, accessibility, and abundant large rainbow trout garnered early regulatory attention. A synopsis of significant regulation changes can be found in Table 20.

Table 20.–A chronology of significant regulation changes for Lower Talarik Creek.

Effective year	Regulation
1965	Spawning season closure imposed on Lower Talarik Creek. Lower Talarik Creek closed to all fishing from April 10 to June 8.
1968	Lower Talarik Creek was included in the "Bristol Bay Trophy Fish Area."
1969	Bag and possession limits reduced to 5 trout, only 1 over 20 inches in length. Helicopter access was forbidden, single hooks were required on tackle.
1974	The use of bait was prohibited during the summer months.
1977	Trophy Fish Area renamed the Bristol Bay Wild Trout Area, retaining the regulations accumulated since 1965.
1981	Gear was limited to single-hook artificial flies from June to October.
1984	Reduced the bag and possession limit to 2 rainbow trout, 1 over 20 inches.
1985	Reduced the bag limit to 1 rainbow trout during the summer.
1990	Adopted the Southwest Alaska Rainbow Trout Management Plan. Lower Talarik Creek was designated as a special management area to be managed under fly-fishing-only, catch-and-release restrictions.
1999	Alaska Department of Natural Resources (DNR) designated as a Special Use Area, the 5 sections of state owned land immediately surrounding the lower reaches of Lower Talarik Creek. Guidelines for overnight camping and commercial activities were established. Also, the ADNR entered into an Interagency Land Management Agreement (ILMA) for approximately 2 acres of land on which stands the Division of Sport Fish (SF) cabin.
2001	The Nature Conservancy initiated a transfer of its privately held lands to the DNR with management responsibilities to be delegated ADF&G SF.

A Native Allotment claim that could have jeopardized public access to the Lower Talarik Creek fishery has recently been resolved. TNC of Alaska acquired title to the claim, which included the land adjacent to the most popular fishing sites along Lower Talarik Creek, through a special agreement with the claimant. In December 1995, TNC coordinated a 3-way land management agreement with ADF&G and DNR. One stipulation of the agreement was to establish a Special Use Area (SUA) for the lower reaches of Lower Talarik Creek and nearby uplands. This was completed in August 1999 with some controversy, and after extensive discussions with local municipalities and leaders. Finalizing the SUA allowed the DNR to enter into an Interagency Land Management Agreement (ILMA) with ADF&G for the land area on which the ADF&G-owned cabin sits. The ILMA was completed at about the same time as the SUA. The next steps in the agreement are to obtain Critical Habitat status for the drainage and the eventual conveyance of the TNC holdings to the State of Alaska for long-term management. During the spring of 2001, TNC advised the State of Alaska of its interest in conveying its lands to the state but there was little movement until late in the year. The conveyance is now complete.

Research

From 2009 through 2015, a weir was operated each season from breakup in April or May until approximately June 7. Consecutive years of weir data were collected to assess spawning abundance, length composition, and life history of Lower Talarik Creek rainbow trout. Upstream and downstream weir counts of spawning rainbow trout from 2009 through 2015 ranged from 49 to 181 and 163 to 794, respectively (Table 21). A comparison of weir counts, visual counts, and length compositions with past data indicate fewer mature rainbow trout and fewer large rainbow trout than in data collected in the 1970s and 1997.

2015 Season

Estimates of sport fishing effort, catch, and harvest will not be available until 2016; however, anglers reported that sport fishing for rainbow trout was good in 2015.

Table 21.–Lower Talarik Creek rainbow trout weir counts 2009–2015.

	Upstream passage			Downstream passage		
Year	Spawner	Nonspawner	Total	Spawner	Nonspawner	Total
2009	98	86	184	271	261	532
2010	78	99	177	511	152	663
2011	103	125	228	330	169	499
2012	99	27	126	456	745	1,201
2013	49	169	218	163	170	333
2014	32	39	71	435	983	1,418
2015	181	63	244	794	857	1,651

KVICHAK RIVER

Fishery Description

The Kvichak River (Figure 1) is recognized around the world for its large rainbow trout. Presently the river is one of the few waters in Southwest Alaska where anglers may still harvest large rainbow trout. Recent studies of rainbow trout in the Kvichak River provide a unique opportunity to examine changes in abundance, recruitment, survival, and age and length compositions of a moderately exploited wild Alaskan rainbow trout population. Additionally, as part of a regionwide comprehensive management planning exercise, SF is developing concise, measurable management objectives for this important fishery. Stock status information is needed to develop specific management objectives for this fishery.

In late winter and spring, rainbow trout aggregate in the upper Kvichak River near the outlet of Lake Iliamna. From 1987 through 1997, ADF&G conducted a mark–recapture study to estimate the abundance and survival of fish in this aggregation. Findings from this study have raised questions about the nature of the aggregation (i.e., whether it is composed of overwintering fish from several natal streams or prespawning fish from the Kvichak River only). If some rainbow trout marked at the upper Kvichak River during a spring sampling event subsequently emigrate and spawn in other streams in future years, then survival estimates from the mark–recapture study are a measure of both mortality and emigration. Radiotelemetric data from sexually mature Lower Talarik Creek rainbow trout suggest the majority of rainbow trout that spawn in Lower

Talarik Creek are not susceptible to angling pressure on the Kvichak River and do not appear to significantly contribute to the prespawning population of rainbow trout in the Kvichak River.

Fishery Management and Objectives

Sport fishery harvests and effort are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*).

The Kvichak River rainbow trout fishery is managed to maintain historical abundance and size composition of rainbow trout.

2015 Season

Estimates of sport fishery effort, catch, and harvest will not be available until 2016; however, anglers reported that sport fishing for rainbow trout was good to excellent in 2015.

ALAGNAK (BRANCH) RIVER

Fishery Description

The Alagnak River, frequently referred to locally as the Branch River, is located in the eastern section of the BBMA and flows into the Kvichak River approximately 40 miles north of King Salmon. The Alagnak River arises in Katmai National Park and Preserve and the upper 55 miles have been designated a Wild and Scenic River.

Two large lakes, Kukaklek and Nonvianuk, feed this drainage. Kukaklek Lake is drained by the Alagnak River while the Nonvianuk River flows 11 miles from Nonvianuk Lake to join the Alagnak River from the south. The Nonvianuk River is a wide, relatively gently flowing river (class two or less) that provides the most convenient float trip access to the upper drainage. The upper Alagnak River is characterized by a narrow canyon and class two rapids that provide a more rigorous boating experience. Below its confluence with the Nonvianuk River, the Alagnak is slower and easily navigated. At the proper water levels, both rivers can be navigated their entire lengths with power boats. The water is clear throughout its length, though the lower 20 miles are colored lightly from silt and bog-stained runoff.

In the lower portion of the drainage, anglers pursue Chinook, sockeye, chum, and coho salmon. In the upper reaches, rainbow trout are the big attraction, with some lake trout (*Salvelinus namaycush*) at headwater lakes and Arctic char and Arctic grayling in the river, adding diversity to the angling experience. The fisheries are accessed with power boats, particularly the lower one-half to two-thirds of the river, while float trips are the most common access in the upper reaches. Several lodges are based along the river and many other lodges from the surrounding area fly clients to the river for day-trip fishing.

The easy access and abundant fish populations of the Alagnak River are major reasons the popularity of this river has grown so quickly. Rainbow trout from the Alagnak River drainage are similar to fish of the nearby Kvichak and Naknek rivers drainages and are known for their abundance and large size.

In terms of angler effort, the Alagnak River is among the top 3 most popular fishing destinations in Southwest Alaska, along with the Naknek and Nushagak rivers (Tables 1 and 2). Estimates of effort and harvest for rainbow trout from the Alagnak River were first available in 1981 from the

SWHS. Historically, effort averaged 6,573 angler days annually from 1977 through 2003 (Table 1). In the last 10 years, effort peaked at 11,747 angler-days in 2006 and has since decreased with a recent 5-year average from 2009 through 2013 of 5,516 angler-days; in 2014, effort was up slightly with 6,013 angler-days (Table 1). Since estimates of catch were first made in 1991, the annual average sport catch (fish released plus fish kept) of rainbow trout from 1991 through 2003 was estimated at 34,518 fish, giving the sport fishery in the Alagnak River the largest catch of rainbow trout in the BBMA during that time (Appendix A4). Harvest rates have dropped dramatically since 1998, when catch-and-release only regulations were instituted to address concerns for the rainbow trout population.

Fishery Management and Objectives

The Alagnak River rainbow trout fishery is managed to maintain historical abundance and size composition.

Sport fishery effort, catch, and harvest are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Subsistence harvests are considered slight but are not well monitored. Onsite surveys yield detailed estimates of angler use and success as well as data on angler demographics and biological samples from the catch. Significant stock assessment and creel survey results, focused on the lower river salmon fisheries but containing some rainbow trout data, have been collected and reported by Brookover (1989), Dunaway (1990a, 1994), and by Naughton and Gryska (2000). Surveys of the spring sport fisheries were conducted jointly with the National Park Service and ADF&G in 1996 at the outlet of Nonvianuk Lake and at the outlet of Kukaklek Lake in 1997 (Jaenicke 1998a, 1998b).

Located between the Kvichak and Naknek rivers drainages, management of the Alagnak and Nonvianuk rivers rainbow trout fisheries has been much the same as outlined for those adjacent fisheries. For quite some time, the sport fishing season has featured a spring spawning closure from April 10 through June 7 and single-hook artificial lure only restrictions. Until 1998, regulations for the open water season allowed the retention of 1 rainbow trout per day with no size limit.

In the 1997 fall BOF meeting, the Alagnak River rainbow trout fishery was restricted by regulation to catch-and-release only out of concerns for the stock status. This no-harvest regulation has been in effect ever since for the period of June 8 through October 31 in the Alagnak and Nonvianuk rivers[10]. From November 1 through April 9, anglers may retain 5 rainbow trout less than 18 inches in length. The new regulations were generally well received by anglers and are expected to provide a measure of protection to this population until better information becomes available. The relatively large rainbow trout and salmon fisheries, coupled with significant float trip and motor boat use, has been a concern of the NPS, nearby communities, and some anglers. NPS has designated the 55-mile portion of the river as a wild and scenic river. Human impacts to uplands, stock status of fish populations, and boat wake erosion are high priority issues.

2015 Season

[10] Alaska sport fishing regulations summary—Bristol Bay drainages (effective April 15, 2015 through April 14, 2016) Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.

Estimates of sport fishing effort, catch, and harvest will not be available until 2016; however, anglers reported that sport fishing for rainbow trout was above average in 2015.

UPPER NUSHAGAK RIVER

Fishery Description

The upper Nushagak River consists of the stretch of river upstream of the confluence with the Nuyakuk River. The upper Nushagak River provides an attractive alternative to more crowded rainbow trout fisheries in the area. The rainbow trout are not as large as those in other rivers of the area, but they are abundant. There are approximately 5 camps situated in this section of river that are operated by sport guide services. In addition, this section of the river is popular for float trips.

Sport fishing effort in the Nushagak River upstream of the Mulchatna River has averaged 1,376 angler days from 2009 through 2013 with a low of 955 angler days in 2011. In 2014, effort was up from recent years with 3,006 angler days[11].

Fishery Management and Objectives

Sport fishery effort, catch, and harvest are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*).

The upper Nushagak River rainbow trout fishery is managed to maintain historical abundance and size composition of rainbow trout.

The upper Nushagak River upstream of Harris Creek, including the King Salmon River, has been designated as a special management area, restricted to unbaited single hook tackle and catch-and-release for rainbow trout since 1990. Sport fishery effort, catch, and harvest are estimated via the SWHS. Subsistence harvests are not well monitored and the best information is obtained from a household survey of freshwater fish harvest conducted by the Division of Subsistence.

Size composition data for rainbow trout between Harris Creek and the Chichitnok River was collected by SF in 1999 and 2006. The average size of fish was approximately 16 inches, and no fish larger than 23 inches were sampled.

2015 Season

Estimates of sport fishing effort, catch, and harvest will not be available until 2016; however, anglers reported that sport fishing for rainbow trout was average in 2015.

NAKNEK RIVER

Fishery Description

The first significant recreational use of Naknek River rainbow trout stocks occurred in the mid-1950s when 2 recreational camps were constructed by the military for use by military personnel. The camps, one located at the outlet of Naknek Lake (Lake Camp) and one at the lower reach of the rapids (Rapids Camp) provided a base for significant sport fishing opportunity until 1974.

[11] Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish [cited October 14, 2015]

During that time period, civilians discovered the bountiful resources, and effort continued to grow. By the mid-1980s there were approximately 12 guiding services working the river regularly, with others less frequently. Boat rental and lodging services, available in King Salmon, provided the necessary support needed by the unguided angler.

The majority of the rainbow trout sport fishery takes place in the upper reach of the river from Rapids Camp upstream to the outlet of Naknek Lake and has 3 periods of activity: March to April 10, June 8 to June 30, and August 15 to freeze-up in October. While rainbow trout may be found during July and early August, the huge influx of salmon during this time tends to depress rainbow trout angling. A few determined anglers seek rainbow trout whenever there is open water, and fishing through the ice is a popular activity for some anglers and some subsistence users.

Guided sport fishing effort on the Naknek River has been relatively stable since 2006, ranging from a low of 3,160 angler-days in 2010 to a high of 4,273 angler-days in 2008 and averaging 3,695. Total sport fishing effort in the Naknek River has remained relatively stable with a historical average from 1977 through 2003 of 13,980 angler days and a recent average from 2009 through 2013 of 14,714 angler-days. Rainbow trout catch in the Naknek River in the last 10 years has ranged from a low of 15,555 fish in 2006 to a high of 31,097 fish in 2009 and has remained stable relative to effort (Table 22).

Table 22.–Naknek River sport fishing effort and rainbow trout harvest and catch, 1991–2014.

Year	Total effort (angler-days)	Harvest	Catch
1991	15,918	720	13,863
1992	14,436	705	14,850
1993	13,674	842	16,393
1994	12,005	366	10,113
1995	16,738	457	14,501
1996	11,971	603	16,888
1997	13,673	246	13,737
1998	13,988	388	12,795
1999	21,189	343	17,946
2000	22,529	450	30,738
2001	12,401	160	16,198
2002	21,020	760	30,635
2003	13,398	171	26,183
2004	16,956	272	20,497
2005	12,699	175	16,431
2006	14,928	196	15,555
2007	17,744	307	25,692
2008	14,444	175	19,886
2009	16,850	60	31,097
2010	16,828	226	22,555
2011	14,465	589	21,869
2012	12,704	48	15,794
2013	12,723	47	15,779
Average 2009–2013	14,714	194	21,419
2014	16,202	94	21,650

Source: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

Fishery Management and Objectives

Naknek River rainbow trout stocks are managed to maintain the historical size composition reported in the early 1980s. Research projects on rainbow trout populations throughout the BBMA, as well as angler reports strongly suggest the rainbow trout population is currently at the historical size composition.

There is a long history of special regulations for Naknek River rainbow trout stocks dating back to statehood. Seasons, limits, and gear restrictions were initially liberal. However, as effort increased, reports of declining catch rates and smaller size of the catchable population increased.

ADF&G studies conducted in the late 1980s verified the suspected decline. Available data supported by public opinion indicate the stocks have recovered. Current regulations still reflect the remedial actions adopted in 1990 and allow for harvest of 1 rainbow trout per day less than 18 inches in length during summer and fall, and a winter season harvest of 5 per day less than 18 inches in length. The spawning season closure is in effect from April 10 to June 7, and only single-hook artificial lures may be used in the area above Rapids Camp. In 1997, the BOF restricted hook gap size to one-half inch or less from March 1 through April 9 and June 8 through July 31 to protect rainbow trout.

In the late 1990s, growing interest in the spring fishery that occurs prior to April 9 sparked heated public requests for more intensive management during this time period. Some anglers supported managing portions of the river for quality of experience by advocating restrictions to angler access. Other management suggestions included managing for a particular size composition in the sport catch with emphasis on providing very large fish. Another group of anglers was convinced that growth of the rainbow trout fishery on the Naknek River required a spawning season closure earlier than April 10 to maintain the biological integrity of the population. Regardless of the perspective, it appears clear that the angling public is extremely interested in maintaining and enhancing this fishery.

Strong fishery performance seems to have allayed the concerns of some individuals. Angler success throughout the recent seasons has been good and there are numerous accounts of large rainbow trout being caught.

2015 Season

Estimates of sport fishing effort, catch, and harvest will not be available until 2016; however, anglers reported that sport fishing for rainbow trout was good to excellent throughout the 2015 season.

OTHER SPECIES FISHERIES

The BBMA offers diverse sport fishing opportunity for a large variety of species that often go unnoticed because of the publicity given to the more popular species. Arctic char or Dolly Varden, Arctic grayling, lake trout, northern pike, and chum and pink salmon are 6 species that contribute to the sport fishing enjoyment of many anglers who fish the area. Catch and harvest estimates are made annually for these other species and trends are followed for the more popular sport species (Appendices A5 and A6).

WOOD RIVER LAKES SYSTEM ARCTIC CHAR

Fishery Description

The Wood River Lake system is a series of 5 large connected lakes north of Dillingham that drain into Wood River and the Nushagak Bay at Dillingham (Figure 1). All of the lakes except the eastern two-thirds of Lake Aleknagik are included in the boundaries of the Wood–Tikchik State Park. This lake system sustains large populations of Dolly Varden and Arctic char, which are very popular with sport anglers and subsistence users. The most popular angling sites are the Agulowak River, which connects Lake Nerka with Lake Aleknagik, and the Agulukpak River connecting Lake Beverly with Lake Nerka (Figure 1). There are many other good fishing spots throughout the system but these 2 rivers (often called the ”wak” and ”pak”) and the outlets of

other tributaries into Lake Aleknagik likely support the great majority of Arctic char angling effort in the system.

When viewed by estimated catch and harvest, the sport fishery for Dolly Varden and Arctic char in the Wood River Lakes is the largest fishery for these species in the BBMA (Table 23, Appendix A5). Between 1977 and 2003, sport fishing effort in the Wood River Lakes averaged 5,706 angler-days per year, and the most recent 5-year average from 2009 through 2013 is 5,599 angler-days (Table 1). Much of the effort is aimed at Arctic char and Dolly Varden, and the bulk of the sport harvest for these 2 species occurs at the mouths of the Agulowak and Agulukpak rivers.

A stock assessment project conducted in 1993 found the abundance of Arctic char at the mouth of the Agulowak River had declined from 12,000 to 5,000 fish over a 10-year period (Minard and Hasbrouck 1994). Sport harvests during the period of decline are thought to have been excessive. This prompted emergency order reduction in bag limits for the 1994 season. Restrictive regulations addressing this fishery were adopted by the BOF in January 1995. The new regulations reduced the daily bag limit from 10 to 2 fish per day and in possession and required the use of single-hook artificial lures. Additionally, a single-hook artificial lure restriction was adopted for the portion of Lake Aleknagik within a half-mile radius of the outlet of the Agulowak River. These restrictions have been in place since the 1994 season (by emergency order in 1994, and by regulation since 1995). Public acceptance and compliance has been good. Overall, the Arctic char stocks at the Agulowak River appear to have recovered, suggesting that the regulatory changes have been sufficient to allow recovery to previous levels. High effort at the outlet of the Agulowak River continues and may require ongoing attention.

Since the BOF action, harvests of Dolly Varden and Arctic char for the Wood River Lake system (Wood River Lakes, Agulowak River, and Agulupak River) have remained fairly stable, with less than 1,000 fish per year since 2005 (Table 23). The vast majority of the harvest comes from the Agulowak River stock; the fishery at the Agulukpak is primarily catch-and-release.

Fishery Management and Objectives

The management objective for this fishery is to maintain the Agulukpak and Agulowak rivers stocks at the abundance and sizes previously documented in the 1980s. Sport fishery effort, catch, and harvest are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Subsistence harvests are not well monitored and are managed by the Division of Commercial Fisheries. Onsite surveys yield detailed estimates of angler use and success. Biological information and demographic information are also collected. Significant stock assessment and creel survey results have been reported by Minard (1989b), and Minard and Hasbrouck (1994).

2015 Season

Estimates of sport fishery effort, catch, and harvest will not be available until 2016; however, anglers reported that sport fishing for Dolly Varden and Arctic char was excellent throughout the 2015 season.

Table 23.–Sport harvest of Dolly Varden and Arctic char from the waters of the BBMA by fishery, 2004–2014, with 1977–2003 average.

Section	Drainage	Average 1977–2003	Annual sport fishing harvest of Dolly Varden and Arctic char										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Eastern														
	Ugashik	198	148	27	14	29	0	0	15	434	0	44	99	0
	Egegik-Becharof	154	136	12	111	38	117	0	152	46	24	0	44	225
	Naknek R.	654	372	93	207	845	93	66	244	269	122	49	150	86
	Naknek L.	67	0	24	14	26	0	0	92	0	32	0	25	30
	Bay of Islands	107	13	0	70	0	45	16	12	0	0	0	6	0
	Brooks R.	22	0	0	0	0	0	0	195	0	16	0	42	0
	Brooks L.	4	0	0	0	0	0	0	0	0	0	0	0	0
	American Cr.	76	316	81	28	215	0	152	304	123	88	0	133	107
	King Salmon R. (Ugashik)	28	0	0	0	0	0	0	0	0	0	0	0	0
	Kvichak R.	79	40	0	53	18	0	42	15	48	16	16	27	17
	Copper R.	20	30	0	0	0	30	0	0	0	0	0	0	389
	Alagnak R.	97	0	13	26	71	0	22	84	0	27	99	46	81
	Newhalen R.	210	0	37	37	69	137	22	70	44	0	0	27	0
	L Talarik Cr.	16	0	0	0	0	0	0	0	0	0	0	0	0
	Lake Clark	125	53	0	0	0	0	0	29	58	11	0	20	49
	Lake Iliamna	111	205	212	83	201	131	0	0	455	0	0	91	0
	Kulik R.	0	0	0	0	0	0	22	0	0	0	0	4	0
	Tazimina R.	19	0	0	0	0	0	0	0	0	0	0	0	0
	Moraine Cr.	2	0	0	0	0	33	0	0	0	0	0	0	17
	Other	447	154	224	109	30	44	34	14	0	0	87	27	15
	Subtotal [a]	2,243	1,467	723	752	1,542	630	376	1,226	1,477	336	295	742	1,016

-continued-

Table 23.–Part 2 of 2.

Section	Drainage	Average 1977–2003	Annual sport fishing harvest of Dolly Varden and Arctic char										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Central														
	Nushagak R.	226	842	161	228	254	63	308	211	235	163	197	223	61
	Mulchatna R.	166	273	120	124	180	121	162	81	83	32	53	82	135
	Agulowak R.	207	296	74	433	153	222	103	166	112	53	88	104	132
	Agulukpak R.	84	53	81	0	9	0	30	308	48	11	16	83	0
	Wood River L. [b]	1,191	2,539	790	468	664	476	770	542	319	279	154	413	381
	Tikchik L.–Nuyakuk R.	194	341	120	0	18	15	166	29	0	0	0	39	68
	Koktuli R.	43	0	24	41	30	0	62	0	0	159	0	44	61
	Other	216	53	118	0	0	11	163	244	97	391	47	188	61
	Subtotal [a]	2,055	4,397	1,488	1,294	1,308	908	1,764	1,581	894	1,088	555	1,176	899
Western														
	Togiak R.	357	501	190	167	256	375	287	90	196	33	153	152	122
	Other	5	0	0	0	0	17	0	0	27	13	37	15	0
	Subtotal [a]	564	501	190	167	256	392	287	90	223	46	190	167	122
Total		4,862	6,365	2,401	2,213	3,106	1,930	2,427	2,897	2,594	1,470	1,040	2,086	2,037

Source: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Subtotals of averages may not be the sum of the drainages because information for some drainages is not available for some years.

[b] Wood River Lakes includes Lake Nunavaugaluk. Prior to 1998, Agulowak and Agulukpak rivers were included in Wood River Lakes.

UGASHIK LAKES ARCTIC GRAYLING

The Ugashik Lakes are located on the Alaska Peninsula, 560 km southwest of Anchorage, and are within the Alaska Peninsula National Wildlife Refuge. Two popular sport fishery areas are the Ugashik Narrows, which connect the Upper and Lower Ugashik lakes, and the Outlet, which includes the upper 2 km of the Ugashik River between Lower Ugashik Lake and a large lagoon. The Ugashik Narrows is approximately 0.5 km long, and consists of 2 main channels with moderately fast water. The Outlet consists of shallow, braided channels with moderately fast water. The Ugashik Lakes area is accessible only by float plane or by boat from the village of Ugashik and Pilot Point, 40 km downstream from the Outlet.

Fishery Description

Angler effort in the Ugashik Lakes area is concentrated at the Narrows and Outlet, with limited effort expended in other parts of the drainage. Due to the inclement weather of the Alaska Peninsula and the remote nature of the Ugashik Narrows, fishing pressure is moderate. Three active lodges and 1 inactive sport fishing lodge are located in the Ugashik Lakes area. In addition, a number of lodges in the King Salmon area fly guests to the Ugashik Lakes for day fishing trips.

Species of interest in the sport fishery include Arctic grayling, coho salmon, and sockeye salmon, Arctic char and Dolly Varden, and lake trout. Annual sport fishery harvest and catch are estimated for the drainage through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*). Rainbow trout have never been officially documented in the drainage, but reports of catches and harvests of this species routinely appear in the sport fish harvest and participation survey.

The primary attraction in the drainage has been the Ugashik Narrows, which harbors a population of very large Arctic grayling. Studies indicate that the Arctic grayling at this site are an accumulation of old large fish (Meyer 1991). From 1967 through 1998, 66 trophy fish certificates or honorary catch-and-release certificates were issued for Arctic grayling in the Ugashik River drainage (Havens, ADF&G, Division of Sport Fish, Juneau, personal communication). From 2009 through 2013, the Ugashik drainage fisheries for all species have an average annual effort of 1,466 angler-days and an average catch of 649 grayling (Appendix A6). Harvest statistics are given in Table 24.

Fishery Management and Objectives

Annual sport fishery harvest and effort are estimated through the SWHS and reported in the ADF&G Fishery Data Series (Mills 1979–1980, 1981a, 1981b, 1982–1994; Howe et al. 1995, 1996, 2001a, 2001b, 2001c, 2001d; Walker et al. 2003; Jennings et al. 2004, 2006a, 2006b, 2007, 2009a, 2009b, 2015; Romberg et al. *In prep*).

Sport fishing regulations have been geared to assure the sport fishery does no harm to Arctic grayling populations and gives the populations sufficient opportunity to reproduce and possibly increase in abundance.

Management of the sport fishery for Arctic grayling in the Ugashik River drainage has been conservative since 1969, when the bag limit was reduced to 2 fish per day. The entire drainage

was closed to the taking of Arctic grayling during 1990 through 1994 after studies found declining and very low grayling populations with old fish and poor recruitment (Meyer 1991; Villegas 1993). In 1995, the BOF allowed a sport harvest in portions of the drainage again, with a 5 fish per day daily bag limit in the Ugashik River drainage, excluding the Ugashik Narrows and Ugashik River, for the period of 1995 through 1997. The Ugashik Narrows has been designated as a catch-and-release Arctic grayling fishery since 1995. The Ugashik River has been closed to Arctic grayling fishing since 1990. During their 1997 winter meeting, the BOF reduced the daily limit where harvest is allowed to 2 fish per day, with no size restrictions[12].

During much of the early and mid-1990s, the Ugashik Narrows was the site of a controversy regarding public access easements for this popular angling site. The state sought to preserve a site easement on Lower Ugashik Lake and a trail easement running north along the west side of the Narrows to public lands along Upper Ugashik Lake. Fly-in anglers had a tradition of getting dropped off on the shores of one lake, angling along the shores of the Narrows and then getting picked up at the other lake at the end of the day. Frequent and rapid weather changes often made the different drop-off and pick-up sites a necessity for safe air travel. A Native corporation sought to obtain control of the lands along the Narrows and objected to establishment of the easements. From 1992 through 1997, there were extensive legal discussions. The state accumulated extensive documentation establishing historical use of the site and trail, and showed its determination to secure these easements through litigation or a negotiated agreement. In August 1997, the Native corporation chose to relinquish its selection of these lands thereby allowing the lands to remain as public lands under the management of the Alaska Peninsula–Becharof National Wildlife Refuge. The Narrows and landing sites at both lakes continue to be accessible to the public. Note that a portion of land on the southeast side of the outlet has been conveyed to a private, Native allotment applicant.

2015 Season

Estimates of sport fishing effort, catch, and harvest will not be available until 2016; however, anglers reported that sport fishing for Arctic grayling was average in 2015.

[12]Alaska sport fishing regulations summary—Bristol Bay drainages (effective April 15, 2015 through April 14, 2016) Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.

Table 24.–Sport harvest of Arctic grayling from the waters of BBMA by fishery, 2004–2014, with 1977–2003 average.

Section	Drainage	Average 1977–2003	Annual sport fishing harvest of Arctic grayling 2004	2005	2006	2007	2008	2009	2010	2011	Average 2007–2011	2012	2013	Average 2009–2013	2014
Eastern															
	Naknek R.	110	27	76	80	526	33	35	14	0	122	0	0	10	10
	Brooks R.	5	0	0	0	0	26	0	0	0	5	0	0	0	0
	Kvichak R.	246	0	48	137	220	464	130	295	49	232	0	0	95	21
	Copper R.	4	0	0	0	0	0	0	23	0	5	0	0	5	0
	Alagnak R.	69	33	119	33	65	0	0	0	0	13	0	0	0	10
	Newhalen R.	232	405	64	96	15	107	17	65	97	60	14	67	52	24
	Lake Clark	294	198	110	58	82	180	241	205	96	161	70	42	131	41
	Other	311	193	0	93	85	81	74	161	99	100	0	72	81	465
	Subtotal [a]	1,264	856	417	497	993	891	497	763	341	697	84	181	373	571
Central															
	Nushagak R.	662	1,507	210	100	339	243	122	176	261	228	380	37	195	98
	Mulchatna R.	271	154	39	216	103	256	205	191	139	179	251	22	162	60
	Agulowak R.	3	0	0	0	19	0	0	0	14	7	0	0	3	0
	Agulukpak R.	15	0	0	0	0	0	0	0	0	0	0	17	3	0
	Wood River L. [b]	75	296	119	0	27	31	10	0	215	57	66	254	109	19
	Tikchik L.–Nuyakuk R.	176	114	22	69	236	320	262	267	0	217	0	56	117	21
	Other	300	34	32	77	121	0	0	14	0	27	0	45	12	20
	Subtotal [a]	1,494	2,105	422	462	845	850	599	648	629	714	697	431	601	218
Western															
	Togiak R.	32	49	0	0	25	67	33	0	0	25	0	9	8	10
	Other	5	0	0	0	0	28	0	0	29	11	28	0	11	0
	Subtotal [a]	38	49	0	0	25	95	33	0	29	36	28	9	20	10
Total		2,796	3,010	839	959	1,863	1,836	1,129	1,411	999	1,448	809	621	994	799

Source: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Subtotals of averages may not be the sum of the drainages because information for some drainages is not available for some years.

[b] Wood River Lakes includes Lake Nunavaugaluk. Prior to 1998, Agulowak and Agulukpak rivers were included in Wood River Lakes.

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APPENDIX A: CATCH TABLES

Appendix A1.–Sport catch of Chinook salmon from the BBMA by fishery, 2004–2014, with 1994–2003 average.

Section	Drainage	Average 1994–2003	Annual sport fishing catch of Chinook salmon										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Eastern														
	Ugashik	471	113	31	408	86	26	151	0	0	69	74	59	109
	Egegik-Becharof	328	790	147	638	16	69	26	78	277	65	148	119	564
	Naknek R.	7,742	10,495	5,664	6,548	3,746	3,067	5,294	4,374	5,667	5,731	2,846	4,782	3,482
	Naknek L.	36	0 [a]	0 [a]	0	0 [a]	0	0	39	0	0	29	14	0
	Bay of Islands	8	0 [a]	42 [a]	313 [a]	0 [a]	13	0	0	17	0	0	3	216
	Brooks R.	14	0	0	0	47	0	10	116	45	0	0	34	264
	Brooks L.	6	0 [a]	0 [a]	0 [a]	0 [a]	0	0	0	0	0	0	0	0
	King Salmon R. (Ugashik)	556	160 [a]	125 [a]	66 [a]	34 [a]	0	0	32	0	0	0	6	0
	Kvichak R.	394	90	452	384	612	900	680	365	246	70	372	347	79
	Copper R.	11	27	15	0	0	104	0	0	0	755	15	154	0
	Alagnak R.	3,184	6,600	6,526	8,383	4,772	1,898	2,609	2,842	4,416	1,249	3,502	2,924	4,265
	Newhalen R.	6	67	0	0	0	207	0	0	0	0	0	0	0
	Lake Clark	11	0	0	0	0	55	0	0	0	0	0	0	0
	Lake Iliamna	75	0	154	0	154	13	0	59	0	0	0	12	109
	Kulik R.	33	0	0	143	0	0	10	830	0	0	0	168	0
	Tazimina R.	6	0 [a]	0 [a]	48 [a]	0 [a]	0	0	0	0	0	15	3	0
	Other	942	212	416	579	169	299	72	268	170	340	0	170	47
	Subtotal	13,822	18,554	13,572	17,510	9,636	6,651	8,852	9,003	10,838	8,279	7,001	8,795	9,135
Central														
	Nushagak R.	36,368	67,341	62,433	49,268	49,999	44,471	32,038	18,199	37,959	33,974	30,807	30,595	24,465
	Mulchatna R.	3,233	1,070	1,959	1,408	1,193	438	391	118	1,477	1,254	997	847	1,034
	Agulowak R.	36	27	0	115	0	13	26	0	0	0	0	5	31
	Agulukpak R.	17	0	15	0	0	0	0	0	245	0	0	49	0
	Wood River L.	560	756	483	1,016	1,045	158	235	159	42	56	184	135	357
	Tikchik L.–Nuyakuk R.	554	801	647	32	1,758	272	308	255	703	2,097	350	743	659
	Koktuli R.	476	66 [a]	50 [a]	48 [a]	683 [a]	0	365	0	0	151	0	103	0
	Other	1,059	770	1,707	746	291	103	691	29	1,253	0	0	395	20
	Subtotal	42,304	70,831	67,294	52,633	55,174	45,455	34,054	18,760	41,679	37,532	32,338	32,873	26,566

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Section	Drainage	Average 1994–2003	Annual sport fishing catch of Chinook salmon									Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Western														
	Togiak R.	4,177	10,043	10,084	13,766	8,319	2,453	4,765	5,213	9,096	6,719	6,392	6,437	10,671
	Other	98	0	0	0	205	0	88	0	545	0	106	148	69
	Subtotal	4,275	10,043	10,084	13,766	8,319	2,453	4,853	5,213	9,641	6,719	6,498	6,585	10,740
Total		60,400	99,428	90,950	83,909	73,129	54,559	47,759	32,976	62,158	52,530	45,837	48,252	46,441

Source: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Unpublished estimates from SWHS for sites with less than 12 responses.

Appendix A2.–Sport catch of coho salmon from the BBMA by fishery, 2004–2014, with 1994–2003 average.

Section	Drainage	Average 1994–2003	Annual sport fishing catch of coho salmon										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Eastern														
	Ugashik	2,016	4,086	4,486	2,285	2,178	258	2,205	1,062	688	893	1,187	1,207	2,426
	Egegik-Becharof	1,139	1,929	4,203	3,033	3,040	2,414	1,976	4,962	3,693	4,281	2,309	3,444	4,797
	Naknek R.	6,609	12,985	5,824	9,182	7,278	9,723	9,065	10,863	6,416	6,391	3,359	7,219	10,130
	Naknek L.	88	54 [a]	877 [a]	133	194	157	25	34 [a]	0	39	114	42	28
	Bay of Islands	30	0 [a]	0 [a]	0	128	59	0	0 [a]	0	0	31	6	120
	Brooks R.	457	466	29	296	189	388	460	132	18	29	61	140	293
	Brooks L.	37	0 [a]	0 [a]	136	266	0	0	0 [a]	0	0	0	0	0
	American Cr.	33	0	132	62	67	303	0	0	0	0	240	48	0
	King Salmon R. (Ugashik)	480	0 [a]	0 [a]	0	0	0	0	0 [a]	27	0	11	8	386
	Kvichak R.	1,327	2,237	3,334	4,455	1,648	3,959	2,443	2,496	3,797	2,734	2,828	2,860	1,493
	Copper R.	234	0	0	27	631	115	247	82	181	14	101	125	521
	Alagnak R.	3,616	3,699	4,885	13,128	3,780	4,582	3,914	2,287	3,551	2,958	5,446	3,631	10,663
	Newhalen R.	457	1,005	15	30	48	93	40	47	60	0	144	58	52
	L Talarik Cr.	119	167	44	18	27	19	0	0 [a]	0	0	172	34	10
	Lake Clark	135	196	0	0	288	192	15	22	27	0	15	16	179
	Lake Iliamna	249	91	292	429	192	48	507	310	202	27	0	209	31
	Kulik R.	63	39	0	62	48	106	128	286	27	127	229	159	112
	Tazimina R.	0	11 [a]	0 [a]	0	0	0	0	0 [a]	0	0	0	0	0
	Moraine Cr.	52	0	0	0	0	19	61	17	27	0	0	21	153
	Other	2,149	1,387	292	142	412	1,461	450	1,540	678	647	486	760	20
	Subtotal	19,291	28,352	24,413	33,418	20,414	23,896	21,356	24,140	19,257	18,140	16,733	19,925	31,414

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Section	Drainage	Average 1994–2003	Annual sport fishing catch of coho salmon 2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average 2009–2013	2014
Central														
	Nushagak R.	4,690	11,721	7,251	7,566	4,521	19,761	15,619	7,518	5,981	10,220	9,811	9,830	14,124
	Mulchatna R.	1,290	1,260	1,445	2,639	2,075	1,171	520	411	563	389	1,717	720	1,900
	Agulowak R.	209	225	0	639	238	484	879	42	237	156	106	284	198
	Agulukpak R.	136	131	27	158	306	29	61	0	36	0	275	74	593
	Wood River L.	1,508	5,673	2,538	2,723	2,050	630	989	1,965	1,350	627	2,864	1,559	2,036
	Tikchik L.–Nuyakuk R.	601	2,207	88	471	67	1,717	122	1,426	846	0	122	503	204
	Other	1,431	2,365	1,881	4,125	1,273	3,708	881	979	369	97	92	484	254
	Subtotal	9,891	23,582	13,230	18,321	10,530	27,500	19,071	12,341	9,382	11,489	14,987	13,454	19,309
Western														
	Togiak R.	6,243	21,279	15,072	16,359	11,712	22,234	5,422	6,471	5,007	17,424	4,258	7,716	10,051
	Other	220	0	0	0	0	163	0	0	2,860	764	984	922	778
	Subtotal	6,463	21,279	15,072	16,359	11,712	22,397	5,422	6,471	7,867	18,188	5,242	8,638	10,829
Total		35,645	73,213	52,715	68,098	42,656	73,793	45,849	42,952	36,506	47,817	36,962	42,017	61,552

Source: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Unpublished estimates from SWHS for sites with less than 12 responses.

Appendix A3.–Sport catch of sockeye salmon from the BBMA by fishery, 2004–2014, with 1994–2003 average.

Section	Drainage	Average 1994–2003	Annual sport fishing catch of sockeye salmon										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Eastern														
	Ugashik	2,290	1,884	133	321	1,472	70	349	1,025	932	1,824	1,022	1,030	504
	Egegik-Becharof	945	840	109	430	973	13	214	128	641	397	178	312	2,116
	Naknek R.	2,183	4,050	3,054	11,518	9,456	12,356	14,134	8,681	7,739	8,610	6,977	9,228	8,521
	Naknek L.	626	0 [a]	0 [a]	96	189 [a]	363	694	0	158	138	445	287	1,065
	Bay of Islands	130	451 [a]	46 [a]	940 [a]	46 [a]	168 [a]	0 [a]	0 [a]	153 [a]	0	114	53	0
	Brooks R.	3,877	2,884	2,027	3,341	1,736	3,729	2,350	2,819	1,725	2,119	2,103	2,223	5,032
	Brooks L.	308	124 [a]	61	220 [a]	305 [a]	342 [a]	101 [a]	149 [a]	47 [a]	261	303	172	890
	American Cr.	868	0	291	664	89	479	1,357	276	572	240	719	754	2,089
	King Salmon R. (Ugashik)	179	0 [a]	0 [a]	0 [a]	0 [a]	0 [a]	0 [a]	0 [a]	0 [a]	0	19	4	0
	Kvichak R.	6,199	4,245	4,064	6,063	4,244	11,003	7,165	7,621	8,911	4,478	3,367	6,308	7,076
	Copper R.	2,822	625	1,113	2,372	1,235	1,085	1,590	2,355	2,296	1,864	2,145	2,050	3,118
	Alagnak R.	11,333	7,876	15,260	8,612	10,971	12,446	10,973	7,235	5,900	8,730	5,107	7,589	2,280
	Newhalen R.	11,895	4,714	3,533	4,566	3,270	3,409	3,920	1,675	1,406	2,553	3,913	2,693	1,295
	L Talarik Cr.	458	248	0	353 [a]	0 [a]	0	0	73 [a]	67 [a]	68	256	93	427
	Lake Clark	1,008	1,388	503	350	141	864	0 [a]	238	429	471	1,024	432	734
	Lake Iliamna	2,505	1,915	1,333	3,398	986	2,407	1,375	2,260	1,171	811	0	1,123	4,828
	Kulik R.	485	1,335	463	1,090	561	563	1,072	505	799	1,405	264	809	1,227
	Tazimina R.	200	45 [a]	0 [a]	651 [a]	0 [a]	0 [a]	124 [a]	0 [a]	0 [a]	0	530	131	0
	Moraine Cr.	384	1,306	897	574	893	884	662	1,022	945	1,765	1,958	1,270	704
	Other	5,380	2,649	4,009	1,752	3,351	4,192	5,033	3,119	67	1,186	2,157	2,312	1,070
	Subtotal	54,075	36,579	36,896	47,311	39,918	54,373	51,113	39,181	21,991	36,920	32,601	30,301	42,976

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Appendix A3.–Page 2 of 2.

Section	Drainage	Average 1994–2003	Annual sport fishing catch of sockeye salmon										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Central														
	Nushagak R.	2,281	1,103	2,054	1,956	1,492	1,543	555	2,144	576	954	786	1,003	753
	Mulchatna R.	1,593	564	1,794	1,038	205	221	668	140	1,164	686	720	676	464
	Agulowak R.		241	1,539	3,943	2,025	1,466	2,374	3,355	784	1,276	600	1,678	2,063
	Agulukpak R.		1,465	351	2,571	1,006	629	1,316	312	2,323	310	203	893	347
	Wood River L.	4,718	2,536	1,680	7,506	5,513	2,923	2,868	2,653	3,222	982	3,423	2,630	6,575
	Tikchik L.–Nuyakuk R.	514	169	0	11	91	765	254	65	277	614	204	283	583
	Koktuli R.	967	260 [a]	0 [a]	184 [a]	513 [a]	61 [a]	101 [a]	0 [a]	0 [a]	27	0	26	0
	Other	1,076	181	412	303	50	1,408	77	0	1,165	112	132	297	348
	Subtotal	11,149	6,519	7,830	17,512	10,895	9,016	8,213	8,669	9,511	4,961	6,068	6,237	11,133
Western														
	Togiak R.	1,144	3,690	2,452	835	2,424	653	920	290	654	2,110	191	833	636
	Other	30	0	0	0	0	28	0	0	0	50	360	82	435
	Subtotal	1,174	3,690	2,452	835	2,424	681	920	290	654	2,160	551	915	1,071
Total		66,398	46,788	47,178	65,658	53,237	64,070	60,246	48,140	32,156	44,041	39,220	31,972	55,180

Source: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

a Unpublished estimates from SWHS for sites with less than 12 responses.

Appendix A4.–Sport catch of rainbow trout from the BBMA by fishery, 2004–2014, with 1991–2003 average.

Sect.	Drainage	Average 1991–2003	Annual sport fishing catch of rainbow trout										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
East														
	Naknek R.	25,609	20,497	16,431	15,555	25,692	19,886	31,097	22,555	21,869	15,794	15,779	21,419	19,876
	Brooks R.	15,793	9,728	8,804	13,399	14,284	15,891	14,648	13,127	16,144	14,896	15,513	14,866	12,243
	Kvichak R.	18,104	25,564	13,435	31,293	30,912	24,545	23,644	18,739	13,753	11,429	16,827	16,878	19,837
	Copper R.	23,179	15,164	8,273	13,571	14,548	14,644	18,751	25,418	18,247	29,479	30,317	24,442	30,138
	Alagnak R.	34,518	19,371	37,195	40,008	39,564	22,194	19,153	6,711	12,536	6,735	9,411	10,909	8,483
	Newhalen R.	4,702	2,720	2,600	2,654	1,615	1,696	357	1,209	1,317	31	1,317	846	603
	Lake Clark	690	2,043	415	47	2,309	13	1,233	151	20	177	383	393	178
	Other	57,544	48,673	36,884	63,275	59,502	72,946	76,422	89,016	48,267	36,002	49,384	59,818	70,949
	Subtotal [a]	180,139	143,760	124,037	179,802	188,426	171,815	185,305	176,926	132,153	114,543	138,931	149,572	162,307
Cent.														
	Nushagak R.	15,323	11,956	6,638	5,609	6,616	5,478	11,785	2,926	3,937	5,256	3,497	5,480	3,302
	Mulchatna	6,559	5,201	2,001	4,046	4,429	2,365	1,954	901	795	735	419	961	735
	Agulowak	10,734	5,230	6,885	7,465	10,760	8,026	5,281	2,517	2,567	1,726	2,292	2,877	5,079
	Agulukpak	13,799	8,335	4,966	6,130	5,965	4,767	5,374	3,413	5,744	1,803	1,902	3,647	4,526
	Wood River L. [b]	10,532	4,575	7,270	6,773	5,784	4,058	2,221	3,293	5,403	578	3,344	2,968	3,015
	Tikchik L.–Nuyakuk R.	2,901	5,167	1,038	588	1,426	1,016	695	720	1,083	813	1,116	885	1,135
	Other	4,583	5,018	2,538	3,331	1,329	1,014	460	277	841	352	269	440	748
	Subtotal [a]	64,431	45,482	31,336	33,942	36,309	26,724	27,770	14,047	20,370	11,263	12,839	17,258	18,540
West														
	Togiak R.	2,339	5,716	3,475	2,261	2,282	3,977	3,638	2,256	3,242	2,741	1,318	2,639	1,889
	Other	151	445	0	0	0	121	0	0	0	27	58	17	0
	Subtotal [a]	2,490	6,161	3,475	2,261	2,282	4,098	3,638	2,256	3,242	2,768	1,376	2,656	1,889
Total		247,060	195,403	158,848	216,005	227,017	202,637	216,713	193,229	155,765	128,574	153,146	169,485	182,736

Source: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

[a] Subtotals of averages may not be the sum of the drainages because information for some drainages is not available for some years.

[b] Wood River Lakes includes Lake Nunavaugaluk. Prior to 1998, Agulowak and Agulukpak rivers were included in Wood River Lakes.

Appendix A5.–Sport catch of Dolly Varden and Arctic char from the BBMA by fishery, 2004–2014, with 1991–2003 average.

Section	Drainage	Average 1991–2003	Annual sport fishing catch of Dolly Varden and Arctic char 2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average 2009–2013	2014
Eastern														
	Ugashik	3,229	8,393	1,838	338	3,150	5,097	5,923	7,327	3,846	2,277	3,153	4,505	11,013
	Egegik-Becharof	3,416	5,353	2,125	1,194	3,388	975	2,245	4,268	4,402	8,180	3,698	4,559	12,144
	Naknek R.	2,994	8,661	6,361	4,439	4,640	3,817	10,259	7,729	5,665	5,465	5,837	6,991	5,673
	Naknek L.	431	227	0	14	281	332	646	445	128	1,151	1,522	778	1,969
	Bay of Islands	250	797	177	70	106	258	204	66	400	0	56	145	0
	Brooks R.	584	296	219	1,333	1,763	431	1,632	917	1,112	1,892	2,131	1,537	1,094
	Brooks L.	93	0	0	0	150	0	163	74	62	182	0	96	0
	American Cr.	5,292	7,795	4,917	5,164	5,063	10,465	9,664	14,725	9,651	5,584	9,848	9,894	8,260
	King Salmon R. (Ugashik)	478	0	0	0	264	0	0	44	0	0	70	23	0
	Kvichak R.	1,457	2,657	599	2,276	1,156	744	2,973	2,040	1,130	1,205	1,232	1,716	1,511
	Copper R.	1,232	642	645	665	406	956	162	413	1,326	5,873	2,055	1,966	7,131
	Alagnak R.	1,792	1,312	2,864	1,602	2,817	2,877	2,694	723	1,118	1,137	1,919	1,518	2,248
	Newhalen R.	1,152	203	463	866	653	169	22	212	180	0	431	169	17
	L Talarik Cr.	114	61	108	0	0	73	0	83	21	0	0	21	67
	Lake Clark	642	810	208	76	232	278	517	29	409	1,207	133	459	717
	Lake Iliamna	685	800	1,539	1,248	175	940	1,092	1,393	749	2,854	347	1,287	4,145
	Kulik R.	143	531	768	903	386	1,191	896	1,234	207	689	678	741	745
	Tazimina R.	236	13	0	66	0	0	0	0	0	0	106	21	0
	Moraine Cr.	133	24	269	79	62	1,685	875	571	435	806	750	687	1,724
	Other	8,727	406	2,627	0	1,243	1,286	3,023	878	2,882	410	9,742	3,387	4,602
	Subtotal	33,003	38,981	25,727	20,333	25,935	31,574	42,990	43,171	33,723	38,912	43,708	40,501	63,060

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Section	Drainage	Average 1991–2003	Annual sport fishing catch of Dolly Varden and Arctic char										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Central														
	Nushagak R.	6,785	12,353	8,358	3,791	5,385	5,997	9,753	3,804	4,329	7,170	9,724	6,956	11,001
	Mulchatna R.	1,439	3,588	1,584	935	2,458	2,099	1,072	844	1,439	121	504	796	338
	Agulowak R.	4,777	3,776	5,133	3,743	5,198	7,037	3,298	4,243	2,241	861	2,551	2,639	4,129
	Agulukpak R.	2,884	6,074	2,128	3,088	3,802	3,279	3,416	7,124	4,486	1,612	2,395	3,807	1,560
	Wood River L.	13,133	22,536	14,528	10,971	8,215	13,148	7,812	9,602	6,793	4,710	14,260	8,635	5,479
	Tikchik L.–Nuyakuk R.	2,742	6,712	1,723	2,158	1,217	1,567	2,152	4,079	1,662	310	828	1,806	2,178
	Koktuli R.	534	327	657	148	74	24	410	0	41	558	0	202	1,218
	Other	1,517	4,043	824	2,034	447	2,003	511	737	263	2,043	346	780	307
	Subtotal	30,233	59,409	34,935	26,868	26,796	35,154	28,424	30,433	21,254	17,385	30,608	25,621	26,210
Western														
	Togiak R.	3,439	11,432	8,450	5,586	4,127	8,667	6,568	2,512	9,087	4,165	2,085	4,883	7,528
	Other	125	0	235	0	0	335	132	0	213	308	322	195	322
	Subtotal	3,564	11,432	8,685	5,586	4,127	9,002	6,700	2,512	9,300	4,473	2,407	5,078	7,850
Total		66,800	109,822	69,347	52,787	56,858	75,730	78,114	76,116	64,277	60,770	76,723	71,200	97,120

Source: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).

Appendix A6.–Sport catch of Arctic grayling from the waters of the BBMA by fishery, 2004–2014, with 1991–2003 average.

Section	Drainage	Average 1991–2003	Annual sport fishing catch of Arctic grayling										Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Eastern														
	Ugashik	1,698	1,317	3,139	459	884	559	946	763	766	207	561	649	708
	Egegik-Becharof	1,491	1,920	716	652	1,193	296	541	2,683	2,021	857	2,847	1,790	1107
	Naknek R.	2,566	1,054	1,803	419	2,345	1,261	3,985	2,171	1,369	1,886	2,100	2,302	1811
	Naknek L.	110	488	0	63	15	0	50	92	0	81	144	73	89
	Bay of Islands	41	0	0	39	58	0	0	0	0	0	23	5	0
	Brooks R.	812	325	132	0	248	360	465	237	89	315	1,429	507	204
	Brooks L.	16	0	0	0	47	0	0	14	118	0	0	26	89
	American Cr.	214	373	119	256	344	1,048	210	189	261	31	423	223	110
	King Salmon R. (Ugashik)	313	0	0	0	0	0	0	0	0	0	0	0	0
	Kvichak R.	5,351	4,028	3,241	3,499	7,362	8,483	6,816	6,276	3,876	7,873	6,091	6,186	6,746
	Copper R.	382	195	0	174	295	27	112	1,089	49	151	515	383	955
	Alagnak R.	4,736	2,429	5,580	5,252	5,856	6,176	5,525	732	3,333	4,274	7,114	4,196	1,588
	Newhalen R.	4,932	1,648	1,855	2,108	2,096	1,466	138	171	274	211	1,888	536	706
	L Talarik Cr.	469	0	70	790	76	98	301	99	245	0	36	136	203
	Lake Clark	4,716	7,400	3,438	1,385	3,929	4,873	4,172	2,821	3,647	1,501	3,799	3,188	2,496
	Lake Iliamna	633	16	22	24	314	67	229	30	196	637		273	4,266
	Kulik R.	55	49	206	496	175	14	429	59	0	172	1,489	430	48
	Tazimina R.	1,593	68	2,015	750	0	352	220	166	49	344	1,606	477	91
	Moraine Cr.	425	290	303	109	241	648	284	1,309	396	1,204	969	832	1,143
	Other	5,647	5,092	937	1,235	2,452	1,784	2,238	4,816	2,172	632	969	2,165	4,499
	Subtotal	36,017	26,692	23,576	17,710	27,930	27,512	26,661	23,717	18,861	20,376	32,003	24,324	23,144

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Section	Drainage	Average 1991–2003	Annual sport fishing catch of Arctic grayling									Average 2009–2013	2014
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Central														
	Nushagak R.	14,178	22,537	11,400	7,659	7,395	6,399	10,965	3,840	3,423	7,034	7,801	6,613	4,926
	Mulchatna R.	3,965	2,402	1,485	3,434	1,056	2,273	855	2,008	1,771	1,360	504	1,300	292
	Agulowak R.	2,315	1,458	2,450	1,520	4,800	1,322	2,001	991	1,157	275	1,065	1,098	1,563
	Agulukpak R.	2,135	4,042	1,916	1,748	1,192	1,235	960	1,008	1,191	1,206	1,453	1,164	872
	Wood River L.	4,836	6,143	5,119	1,133	7,235	4,025	2,142	2,405	3,446	2,052	6,873	3,384	1,732
	Tikchik L.–Nuyakuk R.	7,128	11,271	3,721	1,303	6,442	7,861	3,698	8,098	1,904	2,688	4,174	4,112	2,840
	Koktuli R.	1,335	91	603	743	341	0	328	0	29	0	22	76	426
	Other	4,155	5,840	1,598	2,564	2,440	2,250	2,394	103	1,628	1,370	23	1,104	290
	Subtotal	37,891	53,784	28,292	20,104	30,901	25,365	23,343	18,453	14,549	15,985	21,915	18,849	12,941
Western														
	Togiak R.	1,456	1,772	1,101	454	1,130	7,482	955	301	2,503	208	1,256	1,045	2,005
	Other	45	0	0	0	0	0	0	0	0	0	187	37	0
	Subtotal	1,501	1,772	1,101	454	1,130	7,482	955	301	2,503	208	1,443	1,082	2,005
Total		75,409	82,248	52,969	38,268	59,961	60,359	50,959	42,471	35,913	36,569	55,361	44,255	38,090

Source: Alaska Sport Fishing Survey database [Intranet]. 1996– . Anchorage, AK: Alaska Department of Fish and Game, Division of Sport Fish (cited October 14, 2015). Available from: https://intra.sf.adfg.state.ak.us/swhs_est/ (custom query details available upon request from ADF&G, Division of Sport Fish, Research and Technical Services).